

AVIATION

The Oldest American Aeronautical Magazine

October 6, 1928

Issued Weekly

PRICE 20 CENTS



An aerial view of the Boston Municipal Airport.

VOLUME
XXV

Special Features

NUMBER
15

Airport Lighting
Gliding and Soaring Flight
Airways Communication Service

AVIATION PUBLISHING CORPORATION
250 WEST 57TH STREET, NEW YORK

Entered as second class matter July 27, 1928, at the post office at New York, N. Y., under the act of March 5, 1879. Yearly subscription rates: Domestic, \$4; Canada, \$5. All other countries, \$6.

GRINDS AIRPLANE CYLINDERS

*doubles
production*



*Ground on
a HEALD*



TEARING off from thirty to forty thousandths stock from a thin steel airplane cylinder and getting a mirror finish to the closest degree of accuracy is one of the toughest grinding jobs of today.

These results are all the more astonishing when one considers it was automatically performed and that in spite of the fact that previous production figures were made on modern, up-to-date tools, also gave a better finish to a closer degree of accuracy.

This is but one example of what Heald Engineers are doing for the manufacturers of airplane engines. These Engineers have solved manual grinding problems on practically every airplane engine part where there is a hole to be ground.

It takes quality to give quality and remember

Only a HEALD is AUTOMATIC

THE HEALD MACHINE CO.

WORCESTER, MASS., U.S.A.

Has held the confidence of the trade for over 100 years

TRADE MARK for HEALD'S AVIATION

AVIATION

The Oldest American Aeronautical Magazine

EARL D. CHURCH

R. SMOKEY BOWEN, JR.

Editor

GROVER NEWCOMB

HARBERT F. POWELL

ALBERT E. MULLALLY

DAVID J. LEHR

ALL Business Managers

ALL Editor

Vol. XXV October 6, 1928 No. 31

Index to Contents

EDITORIALS	1067
AIRWAY COMMUNICATION SIGNALS	1069
GLIDING AND SOARING FLIGHT	1072
AIRPORT LIGHTING	1074
WRIGHT KINETIC SYSTEM	1076
THE "SPECIAL" AIRMAN	1077
THE BOSTON AIRPORT	1078
ASSOCIATION OF M. I. T.	1079
NEWS SECTION	1100 to 1111
ENGINE SPECIFICATION TABLE	1112
THE BLYNN'S LOG BOOK	1113
INDEX TO ADVERTISERS	1114

AVIATION PUBLISHING CORPORATION

Business and Editorial Office

218 West 57th Street, New York City

Cable Address: AEROPENG

Publishing Office, New York, New York

Subscription prices: Five dollars per year. Single copy, 15 cents. Foreign, 17 cents. Single copy, 18 cents. Advance payment only. No cash orders. Payment of orders must be made by check or money order. Payment of orders must be made by check or money order. Payment of orders must be made by check or money order.

For Your Convenience in Subscribing

Please send AVIATION to

AVIATION PUBLISHING CORPORATION, NEW YORK, N.Y.

AVIATION PUBLISHING CORPORATION, NEW YORK, N.Y.

Enclosed find check () money order () for \$

performance...



Champion Aviation Spark Plug has revolutionized performance for aircraft engines

THE Champion Aviation Spark Plug with its revolutionary principle and design has given a new tone precision to aircraft engine performance.

All around dependability and the ability to produce maximum power output indeluctably have caused the Champion Aviation Spark Plug to be eagerly sought after and highly recommended by aviators throughout the world. For Champion has produced a better spark plug specifically designed for aircraft engines.

Inferencing all the excellence in material and manufacture exclusive to all Champion spark plugs, the Champion Aviation spark plug represents two years of the most intensive research and the most exhaustive tests. Champion engineers are justly proud of the new factor of safety and the vastly improved performance which Champion Aviation spark plugs are daily contributing to aviation.

The dual function of Champion exclusive refinement is designed that it comes in handy in such a way as to interfere with engine operation. This is itself representative of achievement in design which avails Champion as the better spark plug for aircraft engines.

The unique "dome" insulator which houses the secondary insulator, protects it while no dangerous cooling area separates them. Pre-ignition and "tapping out" are positively impossible.

The high standards of performance already achieved by the Champion Aviation spark plug have definitely established it as a revolutionary factor in the dependability and safety of aircraft engines.

Write for descriptive folder

CHAMPION

Spark Plugs

TELETYPE, CHAMPION

TRADE MARK for CHAMPION AVIATION



Bumpy Mail Plane (39x40)



Aviation
Pratt & W
(1935)



Picture Inset To Motor Passenger Transport (2) Wright

An Unusual Pursuit Engine

In the Free-For-All Military Pursuit event in the National Air Races at Los Angeles a "Wasp" equipped Navy Boeing fighter won first place with an average speed of 171.8 miles per hour—fourteen miles an hour faster than its nearest competitor. In the climb to 10,000 feet and return this same ship again took first honors with the remarkable time of five minutes and 26 seconds—1 minute and 10 seconds under its nearest competitor.

There was a time when a pursuit engine meant short life and lack of dependability. High performance was obtained at the expense of these basic requirements. The results at Los Angeles again proved the merits of the "Wasp" for fighting ships. Its ruggedness and extreme dependability has been equally well proved in millions of miles of commercial flying by individual owners, transport companies, and air mail service.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

TELEPHONE 100 for receiving AVIATION



The Oldest American Aeronautical Magazine

Vol. XXV

OCTOBER 6, 1935

No. 15

Safety First

THE slogan "Safety First" is posted conspicuously on the premises of almost every railroad in the United States. Steamship lines conduct lifeboat drills not only as a matter of form but because they know in the passenger's mind the fact that an emergency might arise and that the price of safety is continued vigilance. Many firms have signs telling of the danger of automobile fatalities. It is only in the aeronautical industry that the possibility of danger is neglected.

Because they are fatalists, or because they believe that the public will be scared off if one speaks of accidents, a great many persons in the industry refrain from mentioning accidents except behind closed doors. When speaking to the public they claim that flying is absolutely safe and that there are less accidents than on the railroad. It is considered poor form, in fact it is a breach of convention, if one slows the word "danger" to escape the lips while talking about flying.

Perhaps this policy was necessary and successful as a temporary expedient, but in the long run it is bound to do more harm than good. Well equipped airlines and good pilots, flown by competent pilots during reasonable weather, are consequently flying in poor places flown by incompetent pilots, especially through bad weather, and dangerous. Yet as far as the public can gather from authorities who speak at length on the subject, flying is absolutely safe. It would be better for the industry and the public if the authorities would come out and say that certain flying is distinctly a dangerous occupation. The public is not as dumb as it is sometimes thought to be. Reuse talk is regarded with considerable skepticism by an intelligent public that reads about aviation accidents in the front page of the morning paper. The public should be taught what flying is safe and what is dangerous, and a campaign to this effect would prove most beneficial.

The catchable policy has, and is, doing much harm within the aviation itself. Eighty per cent of airplane accidents are attributed to the personal element, and well over half of that number are due either to carelessness or trying to pull through under impossible conditions. Every airplane should have a sign, "Do not start at low altitudes if you are," "land before the weather gets to think that you cannot see the ground." As far as the public is concerned such signs would be apt to give them the idea that safety was being considered. It would also teach them not to allow the pilots to get away with some of the stuff that they are getting away with now.

From the standpoint of design, the policy of ignoring the danger of flying has brought out more disastrous results. It would seem as though many designers had succumbed to the authorities and were ignoring the safety element. Reasonably low landing speed is being given up in favor of maximum high speed. Viability for the

pilot has been given up so that slightly better maneuvering may be obtained. Instrument ratings and engine qualities have been given up in favor of such extreme maneuverability that the plane can only be used by expert pilots.

Flying is now standing firmly on its own legs, and there is no necessity of one lying about it. Admitting that flying can be extremely dangerous, and striving through constant vigilance, and through study of the fundamental difficulties, to limit this danger, will speed the industry more rapidly than an attempt to falsify ourselves and the public into thinking that flying is safe.

An Interesting Report

ONE of the many subjects that came up for discussion at the Washington, D. C., Conference a year ago last December was that of the advisability of Department of Commerce regulation of flying schools throughout the country. After considerable argument pro and con it was decided that flying school operators be left alone for the period of one year so that they might have additional time in which to more completely organize and establish their individual institutions, and establish the various problems to the satisfaction of all concerned. At the Los Angeles meeting of the Associated Chapter of Commerce of Aviation, a committee was appointed, under the chairmanship of C. S. Jones, to study flying school standards and report to the International Civil Aeronautics Conference scheduled for December 1934.

The text of this report should be of considerable interest to the entire industry. The year of grace will be ended and we shall learn of the status quo of the American flying school. Without a doubt its problems are among those in the industry which are the most difficult to solve. It is a well known fact that the cost of training to fly is far in excess of what the average person is able to pay. And yet, it is an equally well known fact that the flying school does not make an exorbitant profit at the price charged. The number of hours constituting the average amount of dual instruction necessary is a matter which brings forth a great variance of opinion. Likewise, the type of instruction that the pure student receives.

If the Committee reports that the majority of flying schools have successfully solved these problems, then it would seem best to continue to let the schools alone. It stands to reason that the majority will, and it seems to say so accordingly. And those who do not, will soon pass out of the picture. However, if the Committee reports the existence of the same chaotic state of management that was prevalent in 1927, then the members of the Conference should take steps for an immediate and hasty change in the flying school standards. Aviation's greatest danger at this time is for competent pilots. And when we say pilots we do not mean persons who are merely able to take a plane off and land it right away.

Airways Communication Service

By E. B. CRAFT

Executive Vice-President, Bell Telephone Laboratories

THE greatest development of air transport is bringing out its need for adequate communication in which the same manner as the further development of railway operations disclosed for that industry, the necessity of special communication services, if speed and density of traffic were to be obtained with safety. The electric telegraph by a most fortunate coincidence was available just at the time the railways required it, and as the demand for speed became pressing the telephone was perfected. Today the railways of the country, in general, use the telegraph for administrative matters, whereas a wireless record is wanted, and use the telephone for dispatching, where speed and accuracy are primary requirements.

By another fortunate coincidence, radio appears to be available just at the time it is needed for communication with aircraft in flight. Radio in the form of either telegraph or telephone has been highly developed for communication between points on the surface of the globe. For communication between aircraft and airports it is available in principle, although not yet so well developed. During the war, both in this country and abroad, radio equipment of relatively crude design was installed in aircraft and proved of great utility. Hence the war, radio telegraphy for aircraft has been further developed by the naval and military services, but radio telephony has received less attention, probably because of the inherent difficulties and lack of a pressing demand.

Era of Air Travel Well Underway

Following the remarkable success of the Air Mail and the passage of the Air Commerce Act of 1926, we are now fairly launched into an era of air transport of mail, express and passengers. National airways had not only been authorized by the Department of Commerce under authority of the Air Commerce Act, already companies in concert with the main trunk line mileage of the railways. Scheduled flying over these airways goes on by night as well as by day. A commercial degree of reliability and safety has been reached in so far as the airplane and its engine are concerned and, when surprises due to bad weather can be eliminated, the safety of air transport should compare favorably with that of other forms of transportation.

Although weather is beyond our control, meteorological service is able to forecast its major phenomena with a high degree of precision, provided data describing present and past weather conditions can be collected from a sufficient number of places. The progress of a weather disturbance can be tracked and the time of its arrival at a given point predicted. By means of a suitable communication system weather reports from observers located along and near an airway can be collected; and it should

be possible, therefore, to reduce materially the weather hazard of air transport.

A full-scale meteorological experiment of this nature is now being conducted in California by the Weather Bureau with the co-operation of the Guggenheim Fund for the Promotion of Aeronautics and of the Pacific Telephone and Telegraph Co. Meteorologists at the Oakland and Los Angeles airports receive several times a day, by long distance telephone, weather data from observers at a large number of selected points in the state. After an exchange



E. B. Craft, executive vice-president of Bell Telephone Laboratories, inspecting the experimental radio equipment installed in the Fairchild radio monoplane, used by the company as a flying laboratory.

of these collected data, these meteorologists forecast flying weather for airlines starting out over the airway between these airports. The experiment will be continued until the value of the special weather service can be ascertained.

Since the communication problem of safe air transport presented features, which in a number of respects were unique, it was referred by the Interdepartmental Committee on Aeronautical Meteorology to experts of the American Telephone and Telegraph Co. and Bell Telephone Laboratories. What was desired was the collection

of reports from a considerable number of widely distributed observers in a relatively short interval of time, from twenty observers in twenty minutes. Naturally, it is not commercially practicable to call the party desired, set up the connections, have him answer and give his data all in the space of one minute. However, an equivalent result has been obtained by evolving a special telephone procedure for the purpose. At the appointed time a team of long-distance telephone operators call up successively the listed observers. Each, as he answers, is asked to hold the line and wait his turn when the operator connects him to the airport meteorologist.

It has been found by trial that the weather data can be reported and recorded in thirty seconds. Consequently, the list of observers can be gone through readily if one minute each is allowed. To the Los Angeles and Oakland airports about forty observers are now reporting weather two times a day. These collected reports are exchanged between airports and airplanes starting over the airways are provided with a forecast of the weather they may expect en route and upon arrival.

On the basis of these forecasts, it is hoped that the pilots may be able to avoid bad weather by choosing an alternative route or by selecting the best time to leave under weather conditions are more propitious. Both Los Angeles and the San Francisco Bay region have several airports and there are two routes between them, one up the valley via Berkeley, and the other the more direct line to the west.

The experiment will be carried on for a full year and to cover the complete cycle of the seasons. On the basis of the demonstrated value of this service to the users of the airway, the matter of its continuance or possible extension to other airways can then be decided by the Weather Bureau. Unfortunately, however, California weather is generally good, and the experiment will, therefore, be concerned mainly with local fog and visibility conditions. It is possible also that without other than unaccountable easy discovery advantages in a short range forecast of local weather. If so, the value of the experiment will be correspondingly increased.

Weather data is also being collected in the east from observers in New Jersey and Pennsylvania, and will be collected at Hadley Field, who employs a somewhat similar

method of sequence operation of the long-distance telephone lines.

In addition to the problem of collecting weather data, there is the closely related matter of distributing local weather reports and forecasts between airports. This is "point-to-point service." It may be accomplished by a special radio-telegraph network, by commercial telegraph



The "Maui" powered Fairchild radio monoplane used in radio experimental work by Bell Telephone Laboratories, and members of the staff. L. to R., A. R. Brooks, pilot, F. S. Townsend, technical staff, and E. B. Craft, executive vice-president.

or by long-distance telephone, and over private or leased wires either by telephone or by telegraph. Local conditions, volume of traffic and economic considerations, in general, determine which type of service should be provided.

Besides its use for weather messages, point-to-point communication between landing fields along an airway is desirable for following the progress of an airplane with its passengers and cargo. Such a dispatching service is

(Continued on page 1136)



The Bell Telephone Laboratories' experimental radio station at Whippany, N. J.

Gliding and Soaring Flight

By RICHARD M. MOCK

Associated Engineer, Bellanca Aircraft Corp. of America

THROUGHOUT the United States there is a marked increase in the number of aircraft being built in light planes and gliders, especially those of the engineless type. Though comparatively very little has been done in gliding and soaring in recent years, many groups and a few individuals are now either constructing gliders or soaring machines, or exporting them from Germany.

Last winter the American Motorless Aircraft Club was formed in New York City for the purpose of promoting gliding and soaring flight in the United States. In an effort to give gliding in this country a proper start, the Society requested the co-operation of the German glider-experts, the Rhön Soaring Society, and with its financial assistance J. C. Penney, Jr., three representatives came to this country. Three days later, Peter Henselbach of the Altmannische Fluggruppe in Darmstadt, Capt. Paul Richter of the gliding school at Rossum and Dr. Paul Laubenthal, an engineer of the Wiesenburg Air Travel Association, spent several months looking the proper place and preparing for their first gliding attempt in this country. They finally located at Cape Hill, near Provincetown, Mass., where Henselbach established a new American engineless flight record by remaining in the air for 3 hours in the glider "Darmstadt," which they brought over here from Germany.

Here and, under the supervision of Captain Richter, the first American engineless flying school was established at Cape Hill, Mass. This school, being sponsored by J. C. Penney, Jr., and the American Motorless Aircraft Club Dr. Laubenthal, who gave the author much of the information presented here, is understood to be engineer and technical adviser.

In other parts of the country considerable glider interest is also being shown. The Everet Glider Club of



German glider can fly, clearing the hangars and field.

America, with headquarters in Detroit, Mich., has been formed as part of the National Glider Association of which Edward S. Evans is the principal sponsor. The National Glider Association will act as a parent body for the local glider clubs, and in addition it will offer prizes for annual contests. One of these prizes is understood to be a national trophy valued at between \$3,000 and \$5,000.

The Cass Technical School has constructed a number of gliders, one of which was on exhibition at the AVA American Aircraft Show held in Detroit last year. In the Middle West a number of individuals have constructed gliders, many of which have completed successful flights.

The efforts mentioned above are the only ones of any note in this country since the Massachusetts Institute of Technology glider of a few years ago. It will be recalled that one of those competing in the German annual Rhön contest in 1925. Drawings and details for the construction of this plane were published in *Aviation*, June 22 and 29, 1925.

Gliding and soaring flight should prove an exceptionally popular sport in this country. It requires sufficient skill

and involves enough interest to make it interesting, while the element of cost is decidedly low when compared with that of a powered plane. Gliders can be built as cheaply as \$100 and if the constructor is a skilled craftsman this price can be reduced considerably. Because of the slow speeds and the light weight of the planes, as well as the absence of combustible fuel, the hazards are reduced to a minimum. Indeed, it is seldom that one sustains a major injury while gliding.

Because of many possibilities as a science, gliding should assist greatly in the training of airplane pilots in order to maneuver the glider so as to keep it in the air, the pilot must be thoroughly acquainted with meteorology. This is immediately apparent when it is realized that engineless planes have been kept in the air over 34 hr. and have traveled over 600 mi. in a single flight, utilizing only the favorable air currents to sustain the plane in the air or to direct it to a predetermined point. Thus again there is the other field of gliding; the design and construction of the machine.

Abroad, engineless planes have been constructed with a gliding angle of 1 to 20. Some of these planes have an aspect ratio (span chord ratio) as high as 20 to 1 and are of all cantilever construction with wings extending only five ounces per square foot. The effect of these designs is being reflected in the construction of powered planes and many lessons in aerodynamics, especially in stall, have been learned. Gliders have been fitted with low powered engines which have enabled them to fly under most adverse conditions than can the engineless planes. Some of these power planes develop only 1 1/2 to 2 hp, which is figured to be enough for construction. However, more power than this is needed to take off and some gliders have been fitted with higher powered engines and have taken off with the engines disabled to save horsepower. Most of these engineless planes are fitted with some sort of self-storing device for restoring the engine after it has been shut off in flight.

The low winged Rhön-Darmstadt monoplane, which is now being put into production in this country is a develop-



Two training gliders also crash in the Rhön Mountains.

ment of the glider. It has been developed into a two-place type powered with a 20 hp. Mercedes engine. This engine is fitted with a rotary gear which gives a wide engine preflight design. In the summer of 1927 two Americans landed Europe in one of these planes, crossing the Alps twice. Another example of the utility of this type of machine was brought out a few years ago at a contest held for the lowest land consumption on a light starting from March to Miami. Zepplin of the Alps (at 10,000 ft. already) and returning to the starting point. The contest was won by a 14 hp. light plane competing against planes with engines as large as 200 hp. The fuel

consumption of the winner for the entire trip was just approximately two gallons. Of course, the pilot skillfully used the various air currents of the mountainous country, and thus saved fuel though it is said that at no time did he deliberately attempt gliding or soaring flight.

There has been some confusion between the meaning of the words gliding and soaring. These two are distinctly different acts and often different machines are



German glider experts who visited this country in an effort to increase interest here in gliding and soaring flight, and their American sponsor. Standing from left to right: Peter Henselbach, J. C. Penney, Dr. Paul Laubenthal and Peter Richter.

used for gliding than for soaring. Gliding is more elementary and is directed in the flight as an upward plane when coming in to land with power off. It might be defined as flight in which the downward velocity of the plane creates sufficient lift on the wings to give the plane some forward velocity. (The nose is down so that the lift is not ventral but partly forward.) The more efficient the airplane the higher the lift and the lower the drag and thus it can glide a greater distance from a given altitude.

Soaring flight might be defined as gliding downward in an upward current of air. Any airplane can climb without an engine provided that the vertical component of the velocity of the air current exceeds that of the maximum rate of the descent of the machine. The rate at which the machine will climb is equal to that excess. This might be explained in a slightly different way. If an airplane is gliding in an up-current and the vertical velocity of the up-current is greater than the downward velocity of the gliding plane the result will be that the plane will rise upwards and thus gain altitude. Thus, an upward current of air caused either by convection, turbulence, an obstacle in the path of horizontal wind, such as hills will give a vertical air current suitable for soaring flight. At first it was not realized that both utilize these up currents when they way for hours at a time without flapping their wings. For many years men endeavored to imitate the flight of birds by gliding down hills. However, at the time of these early experiments the internal combustion engine was developed and its rapid success overshadowed the possibilities of sustained flight for some time.

It was not until after the War that gliding was recognized as a large sport. In 1922 the first glider contest was held near the top of Mount Wesselskopf in the Rhön Mountains district in Germany. However the first soaring flight was not made until the following year, as follows: (Continued on page 1193)



A picture of a glider taking off, Rhön Mountains.

few days before that he had broken Orville Wright's gliding record of 10 min. 1 sec., made in October, 1901, by remaining in the air for 58 min. It is understood that he is planning an attempt to break the world's record of 34 hr. 23 min., made this same place. Incidentally, this world's record was established in a plane very similar to the Darmstadt.

Two other gliding machines have been brought over

Airport Lighting

A Review of the Essentials of a Proper Airport Lighting System And How They Can Be Most Practically Covered

By ARTHUR S. FORD

THE sudden advent of air flight as a practical air has brought in its train a host of engineering problems quite apart from those incidental to the construction of the plane itself. And thus, today, even as the construction and equipment of the plane from which planes must start and land.

I believe it is a fair statement to assert that air traffic is waiting on the ground engineer today, just as railroad traffic had to wait for track, switch, and station develop-

ment, as an airport is planned, if it is not carefully done, the most dangerous airport will be for the landing. I have seen airports so badly lighted that I would much prefer to take my chance of a night landing without the aid of their lighting equipment at all.

Let us consider, however, what are the essentials of a proper lighting system and how these essentials can be most practically covered.

The lighting equipment of an airport necessary to secure the A rating under the rules prescribed by the Department of Commerce are as follows:

1. An airport beacon.
2. An illuminated wind direction indicator.
3. Boundary lights.
4. Field flood lights.
5. Obstruction lights.
6. Color projector.
7. Building flood lights.

And of these lights, all but the flood lights and color projector must be operated from 30 min. after sunset until 30 min. before sunrise.

The installation of an airport lighting system, therefore, is obviously one that calls for something more than a lot of mere placing of lights, however powerful. Let us take the case of power lines. The very first essential of a safe landing place is the elimination of every pos-

sible from the boundaries of the landing area or placed in the rear of buildings and not higher than the tops of these buildings. In all cases, poles, cross-arms, transformer boxes, etc., should be painted to give the maximum visibility, and, of course, any obstructions which results must be thoroughly illuminated by obstruction lights as described later.

Taking the governmental requirements in their order, therefore, we will consider the—

Airport Beacon.—The requirements for a beacon light are adequate candle power not less than 100,000 c.p. for long range characteristics for identification flashes of not less than one-eighth of a second with a luminous period of not less than 10 per cent, and frequency of flashes having cycle periods not greater than 10 sec. The beacon may be of the fixed lens type or with combination of lenses with flashing light sources, flash panel lenses, search lights with or without optical apparatus to the equivalent specified or the standard 24 in. rotating beacon with or without flashing lights of distinctive characteristics. A wide latitude is allowed, therefore, by the Department in the choice of beacon light equipment, and the comparative merits of incandescent, gas, or arc light and the various types of diffusing and reflecting media are beyond the scope of this writing.

Illuminated Wind Indicator.—An illuminated wind direction indicator, internally or externally lighted, which is equivalent in effect to the Department of Commerce approved airport type wind cone. This is at least 13 ft. long, 36 in. in diameter at the throat, 32 in. in diameter at the end, constructed of open-work unobscured yellow media and surrounded so as to fly with the wind. A lamp of not less than 200 watts will be required for external lighting. A system of lights and reflectors mounted above the wind cone so as to make it visible from an altitude of 1,000 ft. at night will be considered satisfactory.

Boundary Lights.—These must show the outline of the landing field or the borders of the landing strip. They must be spaced not more than 250 ft. apart and closer spaced in the case of smaller fields. The circuit must be series or multiple type. In series lighting a safety maintenance coil must be installed at the base of each boundary light standard to prevent accidents through the

sums and of the inside fringed type, mounted in boundary fittings and having clear glass or fibroplastic globes. Where the entire field is not available for landing, green lights must be used to indicate the best approaches, being placed so that they may be aligned from the air to show the landing direction. Red lights must be installed in the boundary system at any point where an approach is not possible. Ranges of not less than 30 watts must be



Fig. 4 Diagram showing the use of three groups of low watt parabolic floodlights at the 1500 watt incandescent 24 in type

used for the colored lights so as to obtain the same brightness as that of the boundary lights.

Field Flood Light.—These consist of one or more units, installed so as to give satisfactory, even lighting and not blinding to the pilot. The flood-light system employed must provide even distribution of illumination over the entire usable portion of the landing area. They must be sufficient intensity of illumination to reveal details of the surface and to make possible depth perception from an altitude of 30 ft. The average intensity of the medium must be 0.15 foot-candle per square foot.

The flood light system must be so designed as to be capable of being used for side lighting of aircraft should the major floodlight unit or group of units fail. This secondary lighting system if not in operation with the major units must be so designed as to be turned on automatically without interruption of service.

The lighting must be flexible enough to cover all directions of wind. Glare must be eliminated, and obstacles or the immediate vicinity must be illuminated to aid the pilot in depth perception. There must be a sharp cut-off to prevent blinding, and this must be at a short distance above the ground. Irregular, wavy surfaces must be satisfactorily lighted to eliminate shadows.

Obstruction Lights.—All obstructions must be marked with red lights of not less than 30 watts, mounted in water-tight globes on obstructions or on poles alongside thereof.

Color Projector.—For use in a color projector three is required a 120-v. incandescent floodlight with a 220-volt lamp and a relay light should be mounted on a yoke with a quadrant for elevating and holding the light at the necessary angle of elevation, or an equivalent apparatus. In use of the method in which the vertical beam is used, there must be an accelerometer transmittor or floodlight for removing the vertical angle.

Building Flood Lights.—These must give the equivalent illumination of 200-watt lamps in material reflectors 30 ft. apart in each direction on the hangar roof and along the sides for illuminating the roof and the sides, the or

(Continued on page 1124)



Fig. 1 A diagram of a boundary light system, showing the green lights, turned on at night, marking the corners of the field and the approaches, and the white border lights.

sible, and the automobile had to wait for suitable roads and route developments. The large and growing list of airports and airports partly already operating and under construction gives evidence of the effort being made to meet this condition, and there is no fear but that the engineering losses of the country will be equal to the task it confronts.

Airport construction is evolving from the experimental stage and already a certain definite and fixed practice has been established as standard for successful and efficient day and night operations, but inasmuch as the conditions existing of light are so different from those during the day, the proper and practical dimension of airports calls for the most careful and scientific study. It is this phase of airport construction and equipment I propose to discuss in this article.

Now, at first blush it might seem that any means which resulted in flooding the airports with abundant light would prove satisfactory, but a moment's thought will show that this is far from the case. As a matter of fact, the mere



Fig. 2 Installation of a large projector lamp floodlight unit with a high intensity arc, or a 10 kw incandescent lamp

visible obstruction rising above the level of the ground, it is obvious, therefore, that only under the direct necessity should high watt power lines be brought to the airport under any other conditions than through water ground conductors. If, for any reason, this condition is impossible, then the poles must be removed to a safe dis-

—See *Construction of Airports*, Department Bulletin No. 2 April 1936, Department of Commerce Washington D. C.

Fig. 3 Method of using one group of two or three parabolic floodlight units with a high intensity arc

high-intensity current in the case of collision with the light. For clear lights the boundary globes must be of apical form in preference to the S-type. 6.5 ampere, 600-watt lamps are used for clear lights. For colored lights the lamp output must be 1,000. In series lighting No. 8 II and S 25,000-ohm Parkway table or the equivalent must be used. The wiring for all boundary lighting systems must be underground.

In multiple circuits the lamps must not be less than 25

Wright Engine Service

Wright Aeronautical Corp. Adopts a Parts Dealership Policy Similar to that Employed in the Automotive Field

REALIZING that the provision of expert mechanical service also will be an important factor in the aircraft industry, just as it is now in the automobile industry, the Wright Aeronautical Corp., manufacturer of the famous Wright "Whirlwind" and "Cyclone" engines with headquarters at Dayton, N. J., has adopted a parts dealership policy, providing for the institution of a layer service program, which will be expanded as the aircraft industry continues its growth, and eventually will render Wright parts and service on Wright engines available at the principal airports of the country.

The program is an adaptation of the system used so successfully today by manufacturers of automobiles in calls for the appointment of parts distributors, who will be located in the various aviation centers of the country. These distributing agencies have been selected already. Others will be chosen as soon as the aviation centers become established more clearly. The distributors will be known as "Approved Wright Parts Dealers." They will handle a very complete stock of spare parts for Wright engines, and will be required to perform service work of all descriptions, including that of making general overhauls. In all probability, the distributing agencies also will handle accessories and supplies for both Wright engines and the planes in which they are installed.

Desires to Operate Under Newest Distribution

Within the territories covered by the distributors, there will be dealers, known as "Approved Wright Service Stations," who will operate under the nearest distributing agency either than directly under the engine manufacturing company. These service stations will stock rapidly moving spare parts, and will be equipped to perform more repair work, such as making top overhauls. Moreover, these dealers will be encouraged to maintain as much equipment as possible. In cases where the equipment is complete, it is expected that they will be reimbursed for the performance of complete overhaul work.

The distributor must have an independent organization, specializing in the handling of Wright engine parts and in the servicing of Wright engines, according to Joseph Harbo, head of the sales and service departments of the Wright corporation. There will be no legal connection between the manufacturing company and the distributor, who thus the contract concerning the selling of the engine parts. However, the distributor will be under the supervision of the Company at all times. Factory service also probably will be located in the cities where the Parts Dealers are appointed. These men will not give service except in emergencies, but will make inspection of engine installations and perform other similar duties.

"The company will not grant a Parts Dealer franchise to any organization which concentrates operating the business as a side line," Mr. Harbo said. "Impartial service must be rendered without regard to the types of planes in which the engines are installed or to

the owners. The only way we can be assured that such service is being rendered is by having our distributors act as independent organizations for conducting the business."

The Parts Dealer will be required to have at least one man in his organization who has an unqualified recommendation as an expert mechanic from the Wright Company. Repair work on Wright engines, performed by the distributor's service organization, will be done under the direct supervision of this mechanic. In addition, the Parts Dealer will be required to equip his shop with any special tools that may be necessary to enable him to perform his work in accordance with the standards of the Wright corporation.

The three distributors, who have been appointed by the Wright Company so far, are the Pacific Automotive



Inspecting a "Whirlwind" engine. From left to right, Fred C. Grayson, Wright engineer; Fred Charles J. Lawrence, and Claude E. E. Wilson, U. S. N.

Corp., Los Angeles; Air Associates, Inc., New York; and Steel Metal Airplane Co., Detroit. The Company does not contemplate the appointment of the remaining seven distributors near-fully.

The inquiries for appointment as an Approved Wright Service Station, while fewer, are more the less stringent. The operators of these service stations will be required also to have one mechanic who has received the approval of the Wright organization. Sufficient shop equipment for the minor repair and upkeep work, which these stations are expected to perform, likewise is required. The Service Station must maintain a stock of spare parts, not as complete as that required of the distributors, but sufficient for their work.

"All Parts Dealers and Service Stations must act only (Continued on page 1120)

The "Special Airedan"

*New Three Passenger Cabin Plane Powered With a "Whirlwind"
Is Designed for Cross-Country and Mail Service*

THE Buick Aircraft Co. of Marysville, Mich., has developed the Special Airedan, Model CA-3C, to meet the demand for a cabin plane lighter than the standard "Airedan" to be used in cross country or air mail service where high speed rather than large load carrying capacity is desirable. The CA-3C is a three place monoplane powered with a Wright "Whirlwind" engine developing 200 hp at 1800 r.p.m. It has a cruising range of 800 to 700 mi.

Performance of the plane in test flights has exceeded the predictions of the manufacturer and shows that the CA-3C is well adapted to the service for which it was intended. In four tests over a two mile agon, course the plane attained 140 m.p.h. with the propeller set for maximum high speed. The cruising speed is 115 m.p.h. and the landing speed 45 m.p.h. Rigid take-off and high rate of climb are also features of the plane which was designed by Elmore Dornay, who has had long experience in the aeronautical engineering field.

Lower Wing Largely for Strength

In appearance the plane resembles other Buick models, bearing the characteristic nose and relatively smaller lower wing panel. In the CA-3C model, however, the lower wing has been reduced so the point where it is usually a structural member, resulting in an excellent combination of strength and aerodynamic efficiency. It has an upper wing span of 30 ft., a chord length of 26 ft. and a height of 8 ft. The weight empty is 1800 lb. and the useful load is 1400 lb. The area of the upper wing is the N. A. C. A. 24-12. This is also the basic area of the lower wing. The section through the propeller



Front quarter view of the "Special Airedan"

normal of the effective area is a true M 12, and this is tapered off to both end and up to produce a wing uniformly tapered in plan and thickness.

Conventional practices are followed in wing and fuselage construction, the wings being built of wood and the fuselage of welded chrome molybdenum steel tubing. Stem spars, wing spars for top and bottom members and subspine venter at the sides are employed, and spar and rib locations are placed at 24 inch pitch, compression members and fitting locations. The ribs are of the Warren truss type built up of spruce with veneer grooves running and length and both sides of the top and bottom and forming a perfect closed section. Three ribs are made in the internal bracing of each wing, double drag trusses of square angled wires being used and compression members being steel tubes. The leading edge is covered with sheet aluminum and the trailing edge is a steel tube. Wing tips (Continued on page 1116)



Side view of the Buick "Special Airedan" Model CA-3C

The Boston Airport

City Acquires Control of Landing Field and Starts an Extensive Program of Development to Obtain a Class "A" Rating

By THEODORE G. HOLOMBRE
Secretary Committee on Aviation,
Boston Chamber of Commerce

SIX years have passed since the Boston Airport was created by Act of the Massachusetts Legislature. In that period, the predictions of its most optimistic supporters, as to the growth of air transportation, have been exceeded. The capacity of the original airport area has been far passed, and expansion and development is now going on under a plan that will permit growth in the future as fast as traffic indications warrant.

The bill for the creation of the Boston Airport was introduced in the Legislature by the Boston Chamber of Commerce. It had the active support of the great majority of leading business men in the city, and of a number of organizations and individuals interested in aviation.

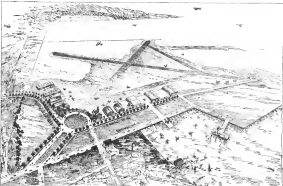
Due to opposition that developed at first, the airport, as laid out in 1922, was not as large as had been hoped. It was felt at the time, however, that it would be adequate for quite a few years. Above all the site selected was ideally situated with regard to the business district and was capable of almost indefinite expansion.

During these six years the control situation has been confused, and in the last year or so might have resulted in confusion, if there had not been a splendid spirit of co-operation among all concerned. It goes, however, without saying that the airport during the formative period, and everything now has been straightened out. The City of Boston has taken over the field, and is developing and operating it as a municipal airport.

The situation resulted from the fact that the land on which the airport is situated, is owned by the Commonwealth of Massachusetts, although it is within the city limits of Boston, on the edge of the harbor, at Jetties Point. It was filled by the Commonwealth some years ago with a view to industrial and shipping development.

When in use for aviation purposes was started it was leased to the War Department for operation and control, with the provision that it should be available for use by civilian fliers. While a National Guard squadron and the

(Continued on page 1115)



A sketch of the Boston Municipal Airport as it will appear when fully developed.

Aeronautics at M. I. T.

Start of Fifteenth Year Finds New Daniel Guggenheim Aeronautical Laboratory Completely Equipped and Ready for Use

By CHARLES H. CHATFIELD
Associate Professor of Aeronautics,
Massachusetts Institute of Technology

THE beginning of the fifteenth year of instruction in aeronautical engineering at the Massachusetts Institute of Technology finds the new Daniel Guggenheim Aeronautical Laboratory in full use. The seven and one-half foot wind tunnel is in operation, the rigging laboratory with its airplanes is ready for students, and the drafting rooms, class rooms and offices of the staff are completely furnished and equipped.

The active staff has been increased to a total of twelve, of whom all but three, who are full-time assistants, devote their spare energies to aeronautics. The recent grant from the Daniel Guggenheim Fund has enabled the Institute to assist the services of Prof. Carl Gustaf A. Rosby, an authority in meteorology who has done outstanding work both in Europe and in the United States, to give advanced courses in this science, with particular emphasis on its aeronautical applications. Professor Rosby will have among his first students a group of six new officers who have been selected to the Institute to be trained in weather forecasting for aviation. A meteorological laboratory is being equipped, and an extensive program of research work will be undertaken.

A further addition to the equipment of the Daniel Guggenheim Laboratory is another wind tunnel, now under construction. This new tunnel, the third, which the Institute has built since 1914, when it constructed the first modern wind tunnel in the United States, will replace the present four foot tunnel. It is to be of the Vorticon



11-foot and one-half foot wind tunnel of Massachusetts Institute of Technology.

type of fluctuations in low-voltage. For measuring the forces on the wind-tunnel models, both a wire balance and an inverted three-arm bell-shaped balance will be installed. Three working platforms will be provided, one underneath, one at the side and one above the tunnel.

On the fourth floor of the new building an instrument laboratory is being equipped under the direction of Prof. W. G. Brown. Here facilities will be available for research and for the calibration of the instruments used in aircraft performance testing. Adjacent to the instrument laboratory is a dark room for the development of photographic records.

Following the practice of several years, another group of special officers has been sent to the Institute for special work in aircraft power plants under Prof. C. F. Taylor. Among these officers is Lieutenant C. C. Champion, Jr., U. S. N., the holder of the world's altitude record. Two officers of the U. S. Army Air Corps have arrived to do graduate work in aeronautical engineering and Captain T. Kozumetsu of the Imperial Japanese Army has entered the Institute for special work in airplane design and in aerodynamics.

It became apparent last year that if all the applicants for admission to the undergraduate course in aeronautical engineering were accepted, even the new facilities of the Guggenheim Laboratory would soon be overcrowded. Since instruction in aeronautical engineering is now becoming available at a considerable number of technical schools and colleges, it was felt that the Institute could

(Continued on page 1114)



The airplane rigging laboratory at Massachusetts Institute of Technology.

type and will maintain five feet in diameter at the working section. The six screws will be set in motion by a four-bladed propeller 10 ft 4 in. in diameter, driven by a 75 hp. electric motor. The maximum wind speed will be 100 m. p. h., and the motor, like that in the seven and one-half foot tunnel, will be equipped with Ward-Leonard control to hold its speed constant, in-

Reviews

The First Encyclopedia, *Aircraft*, 4th Edition, 1978, by the First Encyclopedia, Inc. is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Encyclopedia of Aviation by Virginia Green Clarke. When an engineer or pilot is the very highest class and not a writer, he is not only to make it so elementary as to be of use to the layman, but also to be as good as a dictionary. The book is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

The book contains some two hundred pages and is well illustrated with charts and diagrams. The book is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Model Aircraft: How to Build and Fly. There is the title of a new book on model aircraft construction, which has been placed on the market. It is the work of the late H. Allen. The book is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Louwer Punch Is New Device

COLORADO SPRINGS, Colo.—The Alexander Louwer Corp. has developed a machine to punch the louvers for installation in the engine cowling. The machine is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

A.S.M.E. Aero Branch Holds Wichita Meeting

WICHITA, KAN.—More than 30 aeronautical engineers attended the annual technical convention here of the Aeronautical Society of America. The meeting was held at the University of Kansas. The meeting was held at the University of Kansas.

Papers prepared by the following present were read: A. H. Stinson of the University of Kansas, Richard M. Mack of the Bell Helicopter, formerly of Lockheed, and of Aerojet, George R. Burgess of the Department of Commerce, Walter Buehler, president of Travel Air, James L. Lafferty of Aerojet, William E. Ford of E. I. DuPont de Nemours and Company, and John H. Hargrave of Kansas City. The meeting was held at the University of Kansas.

Morton Aircraft Files Incorporation Papers

GRAND ISLAND, NEB.—Articles of incorporation of Morton Aircraft Inc. have been filed with the secretary of state here. The articles of incorporation were filed with the secretary of state here. The articles of incorporation were filed with the secretary of state here.

Zollman to Teach at Helsinki

HELENSA, MONT.—Morton Zollman of Livingston, Mont., who has been named as the first instructor in the new program at the University of Montana. The program is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Bliss Preparing To Build Jupiter

Machinery Company Gets Two Model Engines from Bristol Free

BROOKLYN, N. Y.—Two model Jupiter engines, manufactured by the Bristol Aeroplane Co., Ltd., England have been loaned to the E. W. Bliss Co., which plans to start production of these power plants in the United States before the end of 1978. The two engines will be given absolutely free to the United States Government for use in the development of the Jupiter engine for use in the development of the Jupiter engine for use in the development of the Jupiter engine.

Charges for the two engines are being applied as to present production of the new engine on a large scale as soon as the tests are completed. The Jupiter engine is considered one of the most highly perfected of the multi-cylinder model type. It has been developed by the Bristol Aeroplane Co., Ltd., England. The engine is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Beloit Airways Bought By Midwest Company

WILSON, WIS.—Associated has been sold to W. A. Hanker, president of Midwest Air Transport, Inc., of 1001 W. Main St., Beloit, Wis. The sale was completed on October 1, 1978. The sale was completed on October 1, 1978.

The Midwest company is also taking charge of student instruction at the Beloit College. The sale was completed on October 1, 1978. The sale was completed on October 1, 1978.

Hendel Touring Europe

MILWAUKEE, WIS.—Carl Hendel, chairman of the Association of Commerce Air Service Committee, has left for a tour abroad in which he will represent the committee in Europe. The tour is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

AIRPORTS AND AIRLINES

Hold Three Day Meet At Mankato Dedication

MANLYND, MINN.—The Minnesota Airport Authority held its third day of the dedication of the city's new 100 acre municipal airport, officially dedicated September 28 to 30. More than 200 guests from all parts of the northwest participated in the day of the dedication. The guests included the mayor, the city council, the state legislature, the federal government, the state government, the local government, the private industry, the media, the public, and the airport authority. The guests included the mayor, the city council, the state legislature, the federal government, the state government, the local government, the private industry, the media, the public, and the airport authority.

New Wichita Company Plans Service to Coast

WICHITA, KAN.—The Pacific Southwest Airways Corp. has been chartered by the State of Kansas, plans to carry passengers, mail, and cargo between Wichita and Los Angeles. The company is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

To Dedicate Wisconsin Field

MILWAUKEE, WIS.—Toward the end of October a new airport of 100 acres, and on which a hangar 80 by 100 ft. is being constructed, will be dedicated. The dedication is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Acquires Moore's Airport

YULIA, OKLA.—North American Air Lines, a new company, has been formed to acquire the Moore's Airport. The company is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Stout to Operate Air Taxi Plans

HELENSA, MONT.—Stout Air Taxi, Inc. of Helena, Mont., has acquired a new second-hand aircraft, which will operate to and from the United States or Canada. The aircraft is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Spokane Votes \$75,000 To Improve City Field

SPokane, WASH.—A ballot of \$75,000 has been approved by the Spokane City Council to improve the municipal airport on this city next year. The money is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Post Bus at the Field

The installation of the field of this type is to be made by the Airway Division. The field is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Set Bonnell Lane Opening

OKLAHOMA CITY, Okla.—The Bonnell Lane opening is to be made by the Bonnell Lane opening. The opening is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Verney Mail Volume Closes

BOISE, IDA.—Verney Mail, a new company, has been formed to acquire the Verney Mail. The company is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Completing Radio Base at Cleveland

CLEVELAND, Ohio.—With the building work 85 per cent completed and with the contract for the building of the radio base at Cleveland. The base is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Station Will Be Second in Class Planned by Department of Commerce

The station is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Richards Field School Active

KANSAS CITY, MO.—Activities at the Richards Field School have been active. The school is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts. It is a new book that is a must for all aviation enthusiasts.

Coast Companies Plan Development

Three California Firms Announce Increase in Service

SAN FRANCISCO, CALIF.—Important developments in air transportation in the Pacific coast, including an additional service over the heavily populated Los Angeles San Francisco Bay region, were being actively planned last week by three companies.

The new service is to be provided by Pacific Airway, Inc., affiliated with Pacific Wings, which operates a number of major stage lines. According to C. F. Wynn, president of the stage company, 15 new passengers a flight have been ordered by Pacific Airway from the San Francisco City of Venice, Calif., and used as a test of air schedule between San Diego and San Francisco and also in connection with a "typical week" system, or a pilot stage-planning system, Los Angeles to Chicago.

W. A. E. in Double Service

Almost simultaneously with this announcement, Mrs. Elvira M. Henson of Western Air Express, Inc. has been told that her company would soon double its service from Los Angeles to Oakland. No new schedule provides for places to leave either end of this line at the morning, evening, or the night, and that there would be, and after a return trip in time for passengers to be taken for dinner. The arrangement is estimated to carry more to leave by home in Los Angeles or San Francisco, toward business for two hours or so in the other terminal city, and be home again.

Middle Air Lines announced a re-arrangement of its schedules to start flights north from Los Angeles at 8:15 A. M. and south by San Diego at 8:15 A. M. the time of arrival at the north is estimated being 12:45 P. M. and that at San Diego being 8:30 A. M. That a week, this new service is estimated to be provided, however, where the planes leave at 10:45 A. M.

Division Air Mail Service

WASHINGTON, D. C.—Due to the continued growth in the mail routes, the rapidly increasing number of air mail routes, and the distribution of mail delivery agencies over the new opening, the new Postoffice General has announced that the air mail service will be divided among the 15 military mail service offices, a condition with different lines, and as impractical.

The new arrangement will not result in any change in the treatment of the air mail service, but the military mail service, it was announced.

Air Mail Saves Firm Penalty

ROCKFORD, ILL.—The largest airmail shipping firm in the United States, the Rockford Express Co., has been the subject of a lawsuit from the St. Louis Post-Dispatch Co. to Los Angeles, where the company is based, for failure to pay for a 24-hour delivery of a newspaper. The lawsuit was filed in the federal court in St. Louis, Mo., on October 10, 1935. The lawsuit was filed in the federal court in St. Louis, Mo., on October 10, 1935. The lawsuit was filed in the federal court in St. Louis, Mo., on October 10, 1935.

Many Attention Opening Of Dodge City Field

DODGE CITY, KAN.—The report here was recently obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Dodge City, Kan., is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Los Angeles-El Paso Daily Service Planned

LOS ANGELES, CALIF.—Daily service between Los Angeles and El Paso is to be inaugurated by the Mexican Air Lines, Inc., according to a statement by J. T. Madden, president of the company. The statement was made on October 10, 1935. The statement was made on October 10, 1935.

While the regular daily schedule will be put into operation at the new factory building arrangements are being made to handle two or more of the eight 12-passenger planes already in the company's hangars, plus additional Pacific Westpacer, and of a still later type, are now under construction, to be placed in the new yards as soon as completed.

Airport for Georgia Town

THOMASVILLE, GA.—Work has started on a new airport for Thomasville, Ga., at a cost of \$100,000. The airport is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Dedicate Landsdowne Field at Greenville, O.

GREENVILLE, O.—Dedication of the new Landsdowne Field at Greenville, O., was held on October 10, 1935. The field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Practically all of the 58 owners in this was represented at the ceremonies which included the crowning of an "Airport Queen" and the dedication of the field. The field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Commander Landsdowne, for whose the airport was named, died while on duty at the Landsdowne field near Columbus, O., on August 1, 1933. He had been in the service of the Navy since 1910. He was the first to fly to the Atlantic in 1910.

Radio News Completion On Dallas-Chicago Line

WASHINGTON, D. C.—Completion of the radio news completion on the Dallas-Chicago line is now nearly completed. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

The completion of the radio news completion on the Dallas-Chicago line is now nearly completed. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Mark Three New Towns

DPS MOVIES, Inc.—The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Bid on Omaha-St. Joe Route

OMAHA, NEB.—Bids are to be opened on October 22 for supplying the Omaha-St. Joe, Mo., airway route, according to a telegram received from the Air Corps. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Phoenix to Be Base of Standard Airlines, Inc.

PHOENIX, ARIZ.—Phoenix has been selected as the location for the new Standard Airlines, Inc., which is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Under the delivery of the first of the new Standard Airlines, Inc., which is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

The seven new planes are now being built according to specifications worked out after careful study of the actual flying conditions in this territory, including ground heat and other factors. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Preparing Caldwell For Mail Plane Use

CALDWELL, IDA.—Work is under way on preparing the Caldwell field for mail plane use. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

As soon as five planes will make their weekly routes here. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Partridgefield Remotely 75

KANSAS CITY, MO.—More than 75 young men representing every state in the Union, are now being trained at the Partridgefield Flying School. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Jameson-Lewis Trust

JAMESON, IOWA.—The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Must Use Plane To Reach Club

OAKLAND, CALIF.—There are long commutes to establish a country club, golf course, and swimming and fishing lodge, which can be reached only by airplane, at the new Oakland Country Club. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Set Date for Opening Of Illinois-Iowa Field

DAVISON, ILL.—The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Dallas Votes Purchase Of Site for New Field

DALLAS, TEX.—Dallas has voted to purchase a new site for a new airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Open First Network Unit

MEMPHIS, TENN.—The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Beacon for Western College

SPokane, WASH.—The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Transfer P. A. T. Air Mail Plan

Moved From Vancouver, Wash. To New Port of Portland Airport

PORTLAND, ORE.—The local Pacific Air Transport mail station was scheduled for transfer from Vancouver, Wash., to the new Port of Portland Airport. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

P. A. T. will have three calls in one of the new scheduled air lines on the island airport, as well as office space, waiting rooms for passengers, radio room, workshop, wash room, and pilot's quarters with showers. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

The company recently indicated its new terminal. It was announced in the report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

Sanita Barbara County To Subsidize Airports

LOS ANGELES, CALIF.—Community or municipal airports established within Santa Barbara County, Calif., will be subsidized to the extent of a sum equal to the cost of the airport, according to an act of the County Board of Supervisors.

Longer is the first town within the county to profit by this arrangement. Under this plan, a field near Los Angeles has been rented for \$75 per month. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

New Beacon for Minneapolis

MINNEAPOLIS, MINN.—A 1,000,000 dollar project involving some known in being installed on top of the 25 story Fisher Building, under construction here. The report was obtained from the St. Louis Post-Dispatch Co. that the Dodge City field is being developed into a major airport.

MANUFACTURER'S SPECIFICATIONS ON ENGINES AVAILABLE FOR COMMERCIAL USE AS COMPILED BY AVIATION
THE TABLE BELOW IS BELIEVED TO BE ACCURATE BUT AVIATION DOES NOT ASSUME RESPONSIBILITY FOR THE PRECISE FITTING

The table will appear monthly and corrections and supplements will be issued

Engine	Model	Year	HP	Weight	Length	Width	Height	Stroke	Compression	Valves	Ignition	Oil	Water	Accessories	Notes
Continental	4-100	1935	100	1,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-125	1935	125	1,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-150	1935	150	1,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-175	1935	175	1,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-200	1935	200	1,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-225	1935	225	1,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-250	1935	250	1,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-275	1935	275	1,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-300	1935	300	1,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-325	1935	325	2,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-350	1935	350	2,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-375	1935	375	2,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-400	1935	400	2,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-425	1935	425	2,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-450	1935	450	2,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-475	1935	475	2,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-500	1935	500	2,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-525	1935	525	2,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-550	1935	550	2,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-575	1935	575	3,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-600	1935	600	3,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-625	1935	625	3,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-650	1935	650	3,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-675	1935	675	3,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-700	1935	700	3,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-725	1935	725	3,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-750	1935	750	3,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-775	1935	775	3,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-800	1935	800	3,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-825	1935	825	4,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-850	1935	850	4,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-875	1935	875	4,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-900	1935	900	4,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-925	1935	925	4,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-950	1935	950	4,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-975	1935	975	4,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1000	1935	1000	4,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1025	1935	1025	4,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1050	1935	1050	4,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1075	1935	1075	5,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1100	1935	1100	5,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1125	1935	1125	5,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1150	1935	1150	5,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1175	1935	1175	5,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1200	1935	1200	5,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1225	1935	1225	5,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1250	1935	1250	5,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1275	1935	1275	5,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1300	1935	1300	5,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1325	1935	1325	6,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1350	1935	1350	6,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1375	1935	1375	6,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1400	1935	1400	6,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1425	1935	1425	6,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1450	1935	1450	6,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1475	1935	1475	6,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1500	1935	1500	6,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1525	1935	1525	6,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1550	1935	1550	6,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1575	1935	1575	7,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1600	1935	1600	7,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1625	1935	1625	7,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1650	1935	1650	7,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1675	1935	1675	7,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1700	1935	1700	7,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1725	1935	1725	7,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1750	1935	1750	7,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1775	1935	1775	7,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1800	1935	1800	7,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1825	1935	1825	8,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1850	1935	1850	8,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1875	1935	1875	8,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1900	1935	1900	8,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1925	1935	1925	8,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1950	1935	1950	8,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-1975	1935	1975	8,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2000	1935	2000	8,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2025	1935	2025	8,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2050	1935	2050	8,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2075	1935	2075	9,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2100	1935	2100	9,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2125	1935	2125	9,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2150	1935	2150	9,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2175	1935	2175	9,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2200	1935	2200	9,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2225	1935	2225	9,600	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2250	1935	2250	9,700	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2275	1935	2275	9,800	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2300	1935	2300	9,900	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2325	1935	2325	10,000	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2350	1935	2350	10,100	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2375	1935	2375	10,200	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2400	1935	2400	10,300	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2425	1935	2425	10,400	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2450	1935	2450	10,500	34	24	44	5.5	16:1	2	1	1	1	1	Standard
Continental	4-2475	1935	2475	10,600	34										

B. B. T. Dual Purpose Light

A NEW auxiliary landing field light has been announced by the B. B. T. Corporation of Annapolis, Atlantic Building, Philadelphia, Pa. This light out-puts only a 2,000 watt incandescent lamp and can be used for temporary illumination at airports during the stages before the installation of major flood lighting systems. It is called by the manufacturer a "Dual Purpose Light" because of the fact that it can be mounted on top of the regular air mail type M-8-D, or intermediate or mail type M-8-D landing flood light.



Low voltage auxiliary landing field light

between hangars on the lighted field while manuevering planes, and handling passengers, baggage, mail and express.

The B. B. T. Corporation has contributed much toward the development of lighting equipment for airports and airways here and abroad.

Rusco Products

SPECIAL MANUFACTURING promises and equipment have been developed by the Rusco Manufacturing Co., 340 Broadway, New York, N. Y., for the production of severely strained and supplies and additions are constantly being made to the Rusco line. Among the products now manufactured by this company are rubber shoes, rubber coats and suits, rubber caps, elastic and non elastic webbing, brake lining and lining.

Rusco rubber cord is made in eight diameters from $\frac{1}{16}$ in. to $\frac{3}{16}$ in. and in tensile strength up to 350 lb. This is used for shock absorbers, vibration mountings, adjustable seats, parachute pack opening, balloon valves and glider slings. For landing gear and tail shaft, rubber rings having cross sectional diameters of $\frac{3}{16}$ in. to $\frac{1}{2}$ in. and tensile diameters of 4 in. to 24 in., increasing by $\frac{1}{16}$ in., can be supplied.

Rusco leathers of all standard sizes are available in cotton, asbestos and asbestos fibre. Cotton or horse leathers, treated waterproofly, dyed or raw, may be had in diameters from $\frac{1}{16}$ in. to $\frac{1}{2}$ in.

The elastic webbing is regularly woven in widths of 4 in. to 24 in., varied by 2 in., but can be fabricated in panel form in any widths of these widths complete with eyelets for attachment. It is made of rubber thread, each strand being individually cotton covered. This construction is used for stretching gap covers or any place where there is relative movement and is treated to insure long

life in the open. Non elastic webbing is made in all thicknesses and widths and is waterproof, dyed or non dyed and having tensile strengths up to 32,000 lb. This is used for tank straps, slings, restraints, straps, pleated belts and other purposes. The belted and tapes are made in practically all sizes.

The company also manufactures complete units including bedclothes, straps and eyelets.

Cabin Instrument Panel

AMONG THE many devices recently developed for the convenience of passengers traveling in transport planes is the new cabin type instrument panel designed by the Pioneer Instrument Co. of Brooklyn, N. Y. This new construction of instruments is the result of the demand for a compact, easily installed unit which will provide passengers at all times with accurate information as to altitude, air speed and time.

The altimeter, which is mounted on the right side of the panel, may be adjusted to read altitude above sea level or above the ground. On the left is the air speed indicator. Both of these instruments are 6 in. in diameter.



Passenger instrument panel designed for cabin mounting in transport planes

and have materials large enough to read at all parts of the cabin of any of the current transport planes. A clock of smaller diameter is placed between and below the other instruments.

Aeronautics at M. I. T.

(Continued from page 1099)

most effectively serve the cause of aeronautics by limiting admission to those students, and by aerial aptitude, assigned last week to take advantage of the opportunities offered.

As the work of the first year is the same in all the engineering courses at the Institute, the number of freshmen in the course in aeronautical engineering is not limited. The first year, however, is regarded as a period of testing and acceptance, and only the better students are allowed to complete the following three years of the course. In the selection made last June, only one-half of the candidates for the first year class were accepted, and these now form a second year class of unusual promise. Students are accepted for the course by transfer from other courses in the Institute and from other colleges, but they are ordinarily required to spend a pre-

AVIATION
October 5, 1938

AVIATION
October 5, 1938

liminary period after transfer to unclassified students, during which they take the necessary preliminary subjects. When they have shown that they can do work as good as that of the students already in the course, they are accepted as regular students in aeronautical engineering.

This policy of limitation has checked the natural increase, which Institute has kept the Institute in the lead in number of students enrolled in aeronautics. To ac-



The David Guggenheim Aeronautical Laboratory at Massachusetts Institute of Technology.

commodate this, however, the classes are kept down to a size which permits the instructor staff to know each student as an individual, and anything wanting of "quantity production" has been avoided.

For graduates in engineering, the Institute offers courses leading to the Master's Degree, and in these courses no limitation has thus far been deemed necessary, since only students of distinct ability are likely to derive graduate work.

The Boston Airport

(Continued from page 1098)

regular units for training the organized reserves have been stationed at the airport since its opening, the greatest growth has come in commercial flying. This practically made the Army the operator of what amounted to a commercial airport.

The increase of flying at the Boston Airport made it increasingly evident that the field had to be enlarged and the control problem settled. In a very comprehensive report to the 1938 Legislature, a special state commission was organized, recommended that the field be leased to the City of Boston. At first there was considerable difficulty in arranging terms of the lease so that it would be satisfactory to both the city and the state.

The lease was finally consummated in August. A necessary bond issue of \$125,000 was voted by the City Council, and work has already started on extending the runways and developing the field. Mayor Niblack plans to ask for further loans of similar amounts to develop the airport into a Class "A" field.

Immediate developments will provide a field runway, 1,800 ft. long and 280 ft. wide, on a site. This will be expanded to approximately a mile. Later it will be possible to extend the airport to the base of Moultrie Island, near the airport, which can be connected

to it by a causeway, provides an excellent location for an airport mooring mast.

The Park Commission, under whose jurisdiction the airport has been placed, plans to build hangars along the south and west sides for the erection of commercial hangars, which will have to conform to certain general specifications. The Crossing-Palmer Port of the American Legion is making a plan for public adaptation for a Municipal Control Tower, to be erected near the entrance.

One of the big advantages of the Boston Airport is its location. By rapid transit connections the heart of the city can be reached in 15 min. or less. Automobiles can go from the airport to the post office by ferry in 15 min. to half an hour. A vehicular tunnel is already authorized from Boston proper to East Boston, which will reduce the crossing time still more.

The airport is an island land jutting into the harbor. It has clear approaches over water, with no obstructions on three sides and no buildings on the fourth for some distance. The cost of making the full exclusive land takeovers, was \$1,637,863. About \$865,000 was spent on developing the airport prior to the present lease of \$125,000.

While major interest has centered on the development of the Boston Airport, other flying activities have not lagged, just across the harbor, at Squamett, the Navy is operating a very successful station for the training of reserves. In the southern portion of metropolitan Boston the Devonport Airport, a commercial field, is being rapidly developed at considerable expense. To the north, Haverhill, in Bennett, is also growing, and is securing its share of business. Other fields are being developed in the immediate vicinity.

From the manufacturers standpoint Boston is well situated. It is the center of a district noted for its quality products, many of which are already stocked in aircraft construction. Customers that have been in business for



A photo of the Boston Airport with hangings to show the present facilities and the plans for the development.

mean, years are studying the aircraft field as an outlet for their products.

Finally, one last exposure, the public in Boston is un-awakened. This may seem a commonplace statement to make in these days. It is evidenced, however, by the press in the August air mail loads over those for July. The increase over the country as a whole was approximately 35 per cent. On the Boston New York route, it was nearly 150 per cent.

The SENIOR AIRSEDAN



EIGHT PLACE—DUAL CONTROL

Specifications

Weight Empty	1,800 lbs.
Wing Span	30 ft.
Wing Area	412 sq. ft.
Length	27 ft. 9 in.
Wheeled Load	3,610 lbs.
Stowing Capacity	2 Pilots, 8 Passengers

Performance

High Speed (Max. Load)	137 m.p.h.
Cruising Speed	125 m.p.h.
Landing Speed	61 m.p.h.

Power Plant

Engine	Waco
Horsepower	411
Fuel Capacity	148 gals.
Oil Capacity	17 gals.

Equipment

Stanny Brakes, Wheel Propellers, Compass, Air Speed Indicator, Navigation Lights, Telemeter, Altimeter, Clock, Two Radios, Fuel, Oil Pressure, and Oil Temperature Gauges, Air Crops, Thermostat, Servitor and Fuel Valve, Exhaust Manifold, Cabin Heater.

Price, \$18,500

Formerly the Buhl, Marysville, Wash.

Buhl Aircraft Company
MARYSVILLE, MICHIGAN

THANK YOU for mentioning AVIATION

The "Special Airedan"

(Continued from page 1087)

are formed by aluminum tubes fastened at the leading edges and at both spars. One coat of Lincol and two coats of spar varnish are applied to all wood and metal parts of the wings, which are covered with Grade "A" fabric, tape and cap strips being sewed over each rib as in standard Army practice. The wings are wired for navigation lights, which are built into boxes on each wing tip. These lights are so placed as to be visible from all angles.

A Fibert balance is employed on a small portion of each aileron near the wing tip end. This produces a balanced aileron which does not protrude beyond the outer edge of the wing and therefore eliminates wing flutter. The interplane wire strut is of streamline stainless steel with an adjustment at the point of attachment to the rear spar to facilitate rigging. The lower wing has a span of 20 ft., 10 in., and is almost triangular in form permitting of



Side quarter view of the Buhl Model C-13C

a very wide gear spacing at the fuselage so that the main bays of the fuselage can be kept the same length at the attachment points of both upper and lower wings. The spars meet at the outer end where the rear strut is attached. This eliminates any drag landing in the lower panel since the spars and intercompression ribs completely insulate the panel.

The fuselage is rectangular in section, braced between bays and slightly flared at top and bottom. Fabric covering is applied to the finished structure and sewed to wood frame strips. It is finished with four coats of clear varnish and three coats of lacquer of any desired color.

In the transverse bracing of the cabin, use is made of ring type instead of diagonal bracing. This results in a large clear open cabin with no interference. This ring type of bracing is also used forward of the pilot and effectively dampens all engine vibrations. On the top of the cabin, the steel tube diagonal is replaced by two angled wires. This construction gives a very effective method of "squaring up" the fuselage for the wings.

An example of the care and amount of thought that has been given to the details of design is shown by the attachment of the flying wires to the fuselage. These wires are fastened to lugs fitted into the lower cross tubes of the fuselage. The lugs are held by the ribs passing through the fuselage tubes, from side to side. Thus, no wires are dependent upon to carry flying wire loads.

Access to the cabin is gained by means of doors on either side of the fuselage. The doors have lugs fitted into the handles in the same manner as in automobile doors. The cabin is large and is upholstered in the style of modern automobiles. A large seat at the rear accom-



Plain Talks on Fine Bearings



No. 3—Aviators are honored—and valued—for their achievements. Pilots are ranked for their reliability and resourcefulness. Shall the same standards be applied to the planes they drive, and to the mechanisms which power and guide them? Or shall price decide—and costly failure be invited for the sake of a small saving in the first cost?

NORMA-HOFFMANN Precision Bearings are inseparably linked with the achievements of Lindbergh, Byrd, Chamberlain, Mailand, Hegenberger. In equipping for the epoch-marking flights of these master-fliers, the price of the bearings to be used was not considered. Bearing dependability was the vital thing sought. NORMA-HOFFMANN Precision assured it.

NORMA-HOFFMANN
BEARINGS CORPORATION

Stamford — Connecticut

PRECISION BALL, ROLLER AND THRU BEARINGS

THANK YOU for mentioning AVIATION

fuel system consisting of a three way valve and strainer, one of the standard Air Service type. Fuel is carried in two wing tanks each having a capacity of 40 gal.

Control surfaces of the empennage are constructed of welded steel tubing and rudder and elevators are balanced. The stabilizer is adjustable down the pilot's seat. Struts attached to the lower longerons support the stabilizer and wires connecting the upper edge of the fin with the stabilizer also contribute to the rigidity of the empennage. Bracing horns and steel pins are used for rudder and elevators because of their wearing qualities. The control surfaces, with the exception of the rudder, are actuated by a system of push-pull rods and bell cranks. The rudder is operated by cables.

Landing gear is of the divided axle type with also compression struts attached to the lower fuselage longerons and a tread of 6 ft., in, taking loads being taken by springs in the struts. The brake torque is taken partly by the axles, and partly by the other members of the chassis which are attached to the fuselage forward of the axles. These members and the axles are attached to the center of the fuselage, the tail cones in line, allowing the wheels a free outward motion under load. The tire size is 30 x 5 and any standard make of wheel and brake can be supplied. Fittings on the fuselage are so designed that gasoline can be substituted for the landing gear when conversion into a seaplane is desired. The tail steel is built of stainless heat-treated chrome-nickel-plated steel and is steerable. A shock absorber cord is used and the tail steel shoe is a manganese steel casting. Equipment includes a metal propeller, oil strainer and fuel strainer in addition to the accessories and instruments previously mentioned.

Specifications and design comply strictly with the requirements of the Department of Commerce and the plane

is licensed under Approved Type Certificate No. 46.

The specifications are as follows:

Wing span (maximum) 36 ft.
Length 25 ft.
Height 8 ft.
Dihedral 35 deg.
Incidence 4 deg.
Sweepback 0 deg.
Wing area 240 sq. ft.
Weight empty 1,800 lb.
Useful load 1,400 lb.

Performance:

High speed at sea level 112 mph
Cruising speed 115 mph
Landing speed 45 mph

Power plant:

Wright Whetwind 200 hp at 1800 rpm
Wing loading 13.33 lb. per sq. ft.
Power loading 14.54 hp per hp
Fuel capacity 80 gal.
Oil capacity 5 gal.

Wright Engine Service

(Continued from page 1096)

power Wright parts for installation on Wright engines," Mr. Hanson continued. "These parts must be purchased from the Wright Company or from service approved by the Company. The Service Stations will obtain parts from the nearest Authorized Wright Parts Dealer. It is for the protection of the Wright engine users that we must insist upon this. There are already substitute Wright parts on the market, and in the future

AVIATION
October 6, 1937

AVIATION
October 6, 1937

A continuous supply of acetylene at very small cost

THE Carbic Portable Generator* furnishes a continuous supply of low pressure acetylene. The initial investment is small and it is extremely economical to operate.

It is so simple in construction it can be charged in three minutes. It weighs only 200 pounds fully charged. It has unusual safety features. If knocked over, the water runs out and generation stops immediately.

With a Carbic Portable Generator and a stock of Carbic you are always assured of an uninterrupted supply of acetylene for any ordinary welding or cutting work.

Send for our new catalogue.

OXWELD ACETYLENE COMPANY
Unit of Union Carbide and Carbon Corporation

0144

New York City, 30 West 42d St. Chicago, Peoples Gas Bldg.
San Francisco, Adam Grant Bldg.

CARBIC GENERATOR

For Oxy-Acetylene Welding and Cutting

*Anyone having a Carbic Generator is entitled to Oxweld Generator Service. Please write our nearest district office.



Made as standard by the Oxwelds' Laboratories, Inc.



A standard form of Carbic contains forty cubic feet, size 12. Carbic is distributed by the Union Carbide Sales Company through its national chain of warehouses.



THANK YOU for sending AVIATION

THANK YOU for sending AVIATION



Trade Mark Registered

The above
trade-mark
identifies the
genuine mohair
fabrics made

by

The Shelton Looms

595 Fourth Avenue
New York, N. Y.

there will be more. A casual inspection will not always reveal the difference between a "generic" part and a "generic" part. However, there is usually a great difference in the composition of the material, in the best treatment of the part and in the accuracy of the dimensions.

"All guarantees and policy adjustments will be handled in a transaction between the engine user and the Guaranty," Mr. Harrison says. "However, the claim and all the details in connection with it, will be handled by a Parts Dealer. When an adjustment is made, our allowance to the distributor is based on the cost of the part to him. He in turn allows the customer the same percentage of the list price. For example, let us suppose that



Front quarter view of a 525 hp Wright "Cyclone" engine.

an operator turns in a leaking cylinder to a Parts Dealer for the purpose of sending it to the factory as a claim. He then purchases a new cylinder at the full retail price to keep his engine in operation.

"If the cylinder is defective, the factory will authorize the distributor to replace it, and will credit his account with the cost of the part to him. The Parts Dealer will then return to the operator the full retail price which he paid for the replacement cylinder. Such adjustments are made to create and maintain the customer's goodwill. This is essential. Without it, neither the dealer organization nor the factory could exist. It would be decidedly unaccountable for the distributor to make a cash profit in such a transaction. The Parts Dealer and the Service Station are selling service primarily. We want parts for our engines to be available of course, but that is simply a part of the service the distributor-dealer organization is to render.

"The factory service organization will assist the Service Stations and Parts Dealers constantly by designing and testing new and improved tools and equipment. We plan also to send specialized sales and service instructions and to refer new customers to our dealers and distributors. These are just a few of the things the factory organization will do to aid the service stations. Publicity and advertising should be included also. Several designs are now under consideration for an official Wright seal,

The Monocoupe

Specially engineered
and designed for the
private owner

PRICE
\$2675.00
RETAWAY AT MOLINE, ILL.

MAN'S desire to fly throughout the ages is now realized, for here is an airplane so easily handled that anyone of normal facilities may operate it with the utmost confidence and safety.

Open the door and step into this luxurious coupe of the air, tailored in mohair with luxurious appointments. Your companion is at your side—by where you will converse with ease. Fair weather, bad weather—this is Monocoupe flying, for you are protected from the wind, snow, rain, noise, soot and gases.

The sturdy Monocoupe with the approved type certificate No. 79, issued by the U. S. Department of Commerce, is rapidly gaining public favor.

Its take-off in less than 100 feet climb, speed, ease of control, safety, economy and ability to get in and out of small fields make it the logical plane for personal use.

Determine now to enjoy the pride of ownership and the pleasure of this greatest of all modern sports in a Monocoupe.



POWERED BY
Long Life **VELIE**

Powered by the famous Velie 5 cylinder air-cooled rated H.S. engine, the Monocoupe meets and exceeds every law for each gallon of gas, creates an 87 mph/100 mile-per-hour work out.

The Velie Aircraft Engine, approved by the U. S. Department of Commerce, Official Certificate No. 49, has been selected due to its proven dependability—the same dependability critically found only in retail sales of the \$3,600 and \$7,000 class.



Monocoupe, Inc. are the first in the field to build national sales through an advertising campaign in national general magazines. Reports of advertisements placed in such magazines as Liberty Magazine has brought in over 15,000 inquiries. The program now continues to Monocoupe distributors and dealers.

There is a great opportunity for dealers and distributors NOW.
Valuable territory is still open. Wire, phone or write immediately for full facts regarding the Liberty Monocoupe franchise.

MONO-AIRCRAFT, INC.

Builders of the Monocoupe and the Monocouach
MOLINE, ILLINOIS, U. S. A.

THANK YOU for mentioning AVIATION

which will be used to identify the Approved Wright Service Stations and the Authorized Wright Parts Dealers. This seal will tell the operators that they may obtain expert mechanical service for their Wright engines at any place displaying it.

"The Service Stations and Parts Dealers are expected to keep those in the factory informed concerning changes in the ownership of engines, any service troubles, notable achievements in their location of planes equipped with Wright engines, information on the various brands of oil and fuel, and the expansion of established aircraft companies and the formation of new ones. Everything considered, it will be a game of give and take which will be extremely profitable to the Wright engine user, the distributor, the dealer and the manufacturer."

The advantages of the system adopted by the Wright corporation of establishing factory appointed Parts Dealers, and under them, the Service Stations, are several in number. As enumerated by Mr. Harrison, they are as follows:

1. There is no "middleman's" profit to be added to the retail price of the various engine parts.
2. A very close connection between the user and the factory is established.
3. It provides a rapid means of supplying service men with technical information.
4. The engine user is assured that his work will be performed by expert mechanics in accordance with the standards of the Wright factory.
5. The engine user is assured that parts will not be sold at prices in excess of those published in the catalog, which will be standard for the entire country.
6. It enables the Company to secure valuable information concerning the performance of its engines, through periodic reports filed by the Parts Dealers and by visits of traveling representatives.

7. It enables the factory to closely supervise the stock of spare parts.

8. It gives the factory a direct means of making policy and guarantee adjustments.

Airport Lighting

(Continued from page 1095)

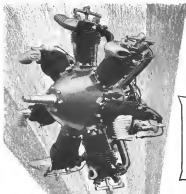
of illumination to be 256 candles per square foot. This may be done by use of flood-light units.

Sufficient personnel to give proper operation of the lighting equipment, for fueling, making engine repairs



Fig. 5. A method of using two groups of five parabolic floodlight units.

during weather service, and for operating the fire-fighting equipment at all times. Operation of beacon, obstruction, wind cone, and boundary lights all night (one-half



Specifications

150 h. p. at 1600 r. p. m.
Bore, 5 1/2 in.
Stroke, 5 1/2 in.
Displacement, 612 cu. in.
Weight dry, 575 lbs.
Outside diam., 18 1/2 in.
Shipped completely equipped

THE COMET

AVIATION • ENGINE

The Comet AVIATION ENGINE has been approved by the Department of Commerce after completing the official, fifty-hour test in five days, running ten hours a day, without a forced stop and without even a minor adjustment. Shipments are now being made for installation in single, twin- and tri-motored airplanes, and the production line is now being ticked up rapidly to meet the urgent demands of the light aircraft industry.

[Complete information will be sent on request]

AIRCRAFT ENGINE COMPANY • 1709 East Twelfth Street • Oakland, California

THE KITT HAWK



3-PLACE DUAL CONTROL RYAN-SIEMENS MOTOR

Adjustable Stabilizer and Fin. Interchangeable Ailerons.
Clear vision, roomy front cockpit—no center section struts.

Write for detailed information.

BOURDON AIRCRAFT CORP.
Hillsgrove, Rhode Island

in the direction of aircraft about to land, and the screen is adjusted to meet varying conditions.

These units spaced 200 feet apart at right angles to the direction of the landing when possible or so placed as to be provided for landing in the maximum number of directions without flooding into the light and with the least amount of glare.

A portable lighting unit suspended on a chain is recommended. This may consist of a single large unit, a single moderate size unit (500 watt-hours), or a battery of four parabolic or dioptric units.

The foregoing covers the basic requirements of general airport lighting, but it is obvious that much research must be done before the ground lighting requirements of aviation have been fully met. The deadly menace of fog and mist poses its head daily, and the toll of life due to this ever imminent danger must be eliminated or reduced. All the lighting equipment in the world is useless if a blanket of fog veils the airport from the landing aviator.

Since the luminous tube or neon light seems to have made most progress. The characteristic red glow of the neon horizon or lamp seems to possess a visibility extended up that of the incandescents or arc light. Experiments are at variance in their opinion as to the actual reason for this greater visibility, and it is yet a disputed point whether the red rays of the neon lights do have the faculty of penetrating fog or whether the red rays by illuminating the moisture particles in the fog cloud only serve to render the fog itself visible. However that may be, it is an undeniable fact that an adequate power source (light behind a bank of fog will render a warning signal that can be detected by the eye when the above, larger impact may be of the arc or incandescents light will be rendered and lost. A new type of lens is announced which is claimed to have unusual fog penetrating qualities owing to the frang-

ible the moisture glass used in the lens material of metallic paraboloids which support a metallic cover to the light rays.

There are many uses in airport lighting for other emergency or temporary lights, such as the old familiar acetylene light derived from kerosene. Obsolete frequently used for temporary illumination at points not otherwise



Fig. 7. Diagram showing the use of distributed parabolic floodlight units spaced 250 ft. apart provided, and then the carbide type flood light will prove of convenience.

The whole question of light as applied to airport illumination, it of course, is a moving and changing target, but its importance is obvious and paramount, and engineers will exhaust every means to bring to the aid of aviation the very best and most efficient equipment and methods in airport lighting and landing.

This is the first of a series of articles by Mr. Ford that will appear in an early issue of AVIATION.

AVIATION
October 6, 1929

AVIATION
October 6, 1929

A Luxurious Flying Yacht



The "PEGASUS" a standard type Sikorsky Amphibion with special cabin equipment, prepared for Mr. John Hay Whitney of New York, is perhaps the most luxurious private airplane yet constructed.



Illustration showing view of Mr. John Hay Whitney's flying yacht. The ship is equipped with a cabin and four chairs, and will comfortably carry eight passengers. Ample baggage space is provided forward of the pilot's compartment and the fuel room is in the stern.

On the right—The "Pegasus" in flight, with ability to land or fly, on either land or water.

SIKORSKY AMPHIBION

Built for men who appreciate and demand the utmost in Speed, Comfort, and Security in travel.

SPEED

The Sikorsky Amphibion has a cruising speed of 110 m.p.h. and a high speed of over 125 m.p.h. In addition, its amphibious feature permits landing and take-off near the heart of the city, thus saving many hours of travel and from outlying airports. *It Saves Time.*

COMFORT

For business or pleasure, a man who can afford a Sikorsky cannot afford to be without one. Nothing is lacking in its appointments to make flying a pleasure. *It Is Comfortable.*

SECURITY

This remarkable airplane will fly and climb on one motor. Plenty of reserve power and its ability to land when and where you wish, land or water, gives a feeling of security no other plane can give. *It Is Safe.*

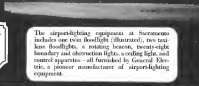
GUARANTEES

The Sikorsky Amphibion is guaranteed to have a high speed of over 125 m.p.h., is guaranteed to have a ceiling of over 20,000 ft., and is guaranteed to fly on one motor with pilot, mechanic, nine passengers and gasoline for five hours.

Illustrated elsewhere upon request.

SIKORSKY MANUFACTURING CORPORATION
COLLEGE POINT, LONG ISLAND, NEW YORK

Sacramento Lights Up



Complete Lighting
Equipment for Airports
and Groups
Airport Floodlights
Emergency Lights
Boundary Lights
Warning Lights
Wing and Guide

The airport-lighting equipment at Sacramento includes one twin floodlight (illustrated), two twin floodlights, a rotating beacon, twenty-eight boundary and obstruction lights, a ceiling light, and control apparatus—all furnished by General Electric, a pioneer manufacturer of airport-lighting equipment.

30733

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y. SALES OFFICES IN PRINCIPAL CITIES

TRADE MARK for marketing AVIATION

TRADE MARK for marketing AVIATION



Model J. Rodgers, Member
of the United States Air Service,
in the White Flying Suit.

The World's Leading Flying Suit

**Veteran of Famous Flights
and Thousands of Flying Hours
including the United States Air Service—
10 Famous Features—**

**Special Flight Suit and Shoulder
Harness—**

**Special Flight Harness at Collar and
Shoulder—**

**The Shoulder—Lee Whitely's design. Shows
shoulder in exactly right position and
is in line with the body.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Lee Whitely's Flying Harness. Shows the
Harness and the body.**

**Lee Whitely's Flying Harness. Shows the
Harness and the body.**

**Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**

**Large Double-Opening Collar Pocket—Access
able with either hand. Shows and handles
with absolute ease.**



Lee WHIZIT
Flying Suits—Union-Aids

Mail your
order!

Please mail me photos and full details on
the Lee Whitely Flying Suit.

Name

Address

Lee Whitely Company
1111 Lee Whitely Building
Cleveland, Ohio

Gliding and Soaring Flight

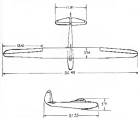
(Continued from page 1093)

person in the proper design and control of the machine had not progressed sufficiently. This first soaring flight was made on a canvas up canvas, on a slope called "Wing" on a special corner of those mountains, which is ideal for gliding, having a tall mountain (Mount Vassart) surrounded by small hills. The mountain runs about 2000 ft above the plain to the north and its slope offers all types of topography. In fact, here slopes and glides, rugged gorges and fir covered hills.

The first glider camp was established on this mountain in 1921, and shortly after the first gliding society had been organized. Later glider schools, and, recently, a permanent research station were established there.

These first glider meetings in Germany in 1921 caused nationwide interest and during the following year another gliding meeting was held which was attended by thousands of people. Attempts were made to establish records and it was not long before the one hour endurance record was reached. Then flight progressed rapidly and endurance records up to seven or eight hours were attained. Before long efforts were made to fly across country, and finally to establish distance and altitude records.

It might be well to mention something on how these sustained flights are made. Flights for endurance are considered simpler than those for altitude or distance. They consist mainly in staying in an area or zone with an up current. However, a great deal depends upon the skill of the pilot as he must work on as much of the energy of the



Two-view drawing of the "Dorland" glider.

wind as possible. Often the air currents vary in intensity and it is necessary to rise to altitude in one current and then glide downward to a point where it is known that there is another up-current, and then to gain altitude again. A hill or ridge of hills arranged like a horseshoe is ideal for this purpose, when the wind is blowing toward the open side of the horseshoe, as an up-current is established on the outer slope of the ridge, thus allowing the pilot to glide from one side to the other, soar upwards, and glide back again.

To reach great heights, such as those desired for altitude records, one must look more carefully for special

For POWER specify "Van Dorn"



**Quarter-Inch Heavy Duty
Electric Drill**

No. C-8100

\$ 36.00

This is an indispensable tool for any shop, large or small. It is an exceptionally rugged ball-bearing drill, designed for heavy duty work and, like all Van Dorn Electric Tools, is characterized by its powerful "Van Dorn built" universal motor. Write for illustrated bulletin.

The "Van Dorn" Electric Tool Co.
Cleveland, Ohio.



Art Goebel

ART GOEBEL one of America's crack pilots uses Meyrowitz Laxer Goggles



Prices U. S. Air Service No. 8 (Aukrain)

Wing, white, reinforced	\$2.15
Wing, black, reinforced	\$2.15
Wing, black, reinforced	\$2.15
Wing, black, reinforced	\$2.15
Wing, black, reinforced	\$2.15
Wing, black, reinforced	\$2.15

Regular Model 6 Wing, white, reinforced

Wing, white, reinforced	\$1.15
-------------------------	--------

U. S. Air Service No. 8 Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

Wing, white, reinforced

Wing, white, reinforced	\$2.15
-------------------------	--------

printed position. This type of construction is claimed to lessen the liability of the pilot being injured in the event of a crash. Since the student has no visible reference for the position of the glider with respect to the horizon, he is obliged to learn to fly by feeling. It is believed that training in this manner would be beneficial to airplane pilots who, when deprived of their instruments, are obliged to fly entirely by their senses.

The student usually begins by making a number of short jumps, namely take-offs and landings. The length of the jumps are gradually increased, the student starting at the base of a hill and progressing upward to the crest. This takes about 18 or 20 jumps in the school routine.



The "Dornado" in flight, Rhon, Germany.

before the student is ready for his first soaring flight in what is called a training machine. Conventionally, these are high winged monoplanes of somewhat higher aerodynamic efficiency than the school machines, they have a fuselage, fixed struts, etc. After a number of flights in a training glider the student can progress to a machine of better, though more delicate construction. These gliders, which are called high performance machines, are of remarkably high aerodynamic efficiency. They are commonly sensitive to the controls and have a large wing span with a high lift airfoil. It is claimed that some of these planes have a lift drag ratio of 21 or 22, which is exceptionally high when it is considered that theoretically the limit of this ratio for a plane having a fuselage, radiator, etc., is said to be close to 31 or 32.

These high performance machines differ from each other in design even more than powered planes. As outlined in an article by W. Hubner in the German publication, *Zeitschrift für Verkehrs- und Luftfahrt*, December 3, 1932, reviewing the Rhon Soaring Flight Contest of last year, there has been little progress in recent years in the design of gliders, most of them being refinements of the planes of 1922. However, the dissimilarity in these various types is of interest. Most of them are high wing monocoques of high aspect ratio. The aspect ratios of these high performance types varying from 13 to 20 with planes of greater wing span, being externally heated. The "Dornado," which is now in its country, partook in the 1932 Rhon contest and is said to be pre-eminent in its class, owing to the fact that it has an empty weight of 331 lb. It has a span of 52.69 ft. as compared with a chord of 3.94 ft. and length of 23.35 ft. The wings are externally heated and constructed of four ply birch on



THE future of aviation is tremendous—assured. But what about YOUR future in it?

What do you see in the skies for yourself? A career of thrilling work with big pay and a glorious future can be yours in the world's fastest growing industry!

America has passed the stage where ordinary training methods mean anything. Where you are trained, and how you are trained, will determine your place in Aviation's phenomenal youth-line career from now.

It only you are more to receive your training at the world's largest and most elaborately equipped aviation school, Parks Air College, actually recognized, is really sending out graduates to good jobs in the industry. Park-trained pilots are making \$200 per month and up.

Our organization alone has agreed to take 25% of our graduates pilots by contract.

The photos on this page put you just a few minutes of Parks Air College. Located in St. Louis, the recognized center of aviation in America, Parks Air College has facilities and accommodations unsurpassed in the world you are here with your own eyes.

Twenty-five licensed training planes, fifteen transport planes, over 1250 hours worth of training equipment, hangars, classrooms, restaurant, recreation hall, etc.—Parks Air is a great university!

You get flying instruction every day on latest new training planes equipped with CEE and Wheeland engines. Let us show you the school and the school—through these pictures that turn you not a real pilot, but a real one.

THOROUGH TRAINING
At Parks Air College you are taught

stunt flying, aerobatics, forced landings, vertical take-offs, cross wind landings, cross country flying, emergency landings, and other flight details, by nationally known transport pilots.

In addition to flying, a pilot must know aerial signaling, meteorology, accident causes, be familiar with such regions as Whitehurst, Canada, Cuba, Yule, Waip, and others. You can know how to take care of your own ship! All this is included at Parks Air College!

So, would students have come to Parks from every state in the Union and from Canada, Panama and South America? It is smaller than are our own country from Honolulu, Europe, even Africa!

SPECIAL OFFER FREE

Our 24 page catalog "Skyward Bound" gives full details and all the facts about flying, about commercial aviation, and about our Parks Air College. Contact 40 actual photographs, illustrations, as you can see with your own eyes exactly how Parks really is.

A copy will be sent free if you write at once, together with detach of one post card, \$155 on your letter by enclosing either the next 2 weeks!

If you are around about your letter, we'll give you a copy of "Skyward Bound" and the catalog "Air Mail to Coast".



10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky

10 prominent pilots in the sky



LARGEST CIVILIAN AIR SCHOOL IN AMERICA
204-G MO. THEATRE BLDG. ST. LOUIS, MO.

To Pass the TRANSPORT PILOT'S EXAMINATION

you must know

Navigation and Meteorology

A book has been prepared which thoroughly covers the examination for any grade of license in these subjects, and if the candidate will spend a few hours studying it no difficulty will be experienced.

\$2.50 Postpaid

Mail Order to:

Captain Lewis A. Yancey
427 West End Ave., New York City

CAPTAIN LEWIS A. YANCEY
427 West End Ave.
New York City

Enclosed please find check for \$2.10 for which send me copy of *Aerial Navigation and Transportation*.

NAME

ADDRESS

CITY

STATE

AVIATION
October 6, 1938

reed with fabric. The wings have a constant chord for a span of 21.35 ft. and then taper to the wing tip. The surfaces extend the length of this tapered portion, having a length of 12.44 ft. each. The tail surfaces, too, are of high aspect ratio, the span of the stabilizer being 11.61 ft. The height of the plane is 5.9 ft.

Comparable to the Dornier's is the "Obenchesleben," an extremely broad wing type with an aspect ratio close to 20, the span is 29.05 ft. and the chord 1.28 ft. for the central portion of the wing and 1.90 at the tips. The entire



Diagram of wing planform made before canvas clouds.

tail bracing is from a point below the fuselage to the upper wing rib joint of where the upper begins. The horizontal surfaces have a span of 11.65 ft. and a total chord of 23 ft., while the vertical surfaces, which are entirely above the fuselage, have a height of 5.74 ft. and a chord of 1.90 ft. The overall length is 19.18 ft.

In the Technical Center there were two very interesting designs, the "La Pavo" and the "Zanokang." La Pavo was a high wing monoplane with a peculiar plan form. The wings might be said to have a negative sweep back tapering from 4.27 ft. at the root to 2.8 ft. at the tip. The wings were internally braced with a fairly small span of 20.33 ft., which is said to permit the utilization of small tapered girders of air such as those under canvas clouds. Like many gliders, the lateral control is obtained by rotating the wing tip about a horizontal axis, a method originally employed by Etemad. La Pavo had an empty weight of only 77 lb. The Zanokang was a high wing monoplane with an exceptionally short fuselage (12 ft.), in contrast to the fairly wide wing (span 32.7 ft.). The aircraft employed was one of symmetrical section with its center of pressure fixed, thus causing the wings to be lighter, as no torsional effects were produced. However, it is believed that the ailerons did cause some torsional effect. It is also said that by using a symmetrical airfoil the movement left was reduced about 30 per cent. before that a reversed section had been used. Directional control is obtained by vertical rudders at the wing tips which can be turned through 90 deg. and thus act as air brakes when landing. The Zanokang glider weighed only 99 lb. empty.

Airways Communication Service

(Continued from page 1101)

somewhat analogous to that of a railway and is a necessity of scheduled connections with trains and other aircraft are to be met. Also, there is the necessity of accessibility for mail and express. For example, on departure the landing fields ahead must be informed not only of the fact of starting but of what mail is on board. Upon landing there must be a message concerning the arrival. In this way the progress of a plane can be followed by the terminal airports.

(Continued on page 1138)

AVIATION
October 6, 1938

1137



Aeronautical Supplies

A complete line of Etemad instruments, hand gear, goggles, wireless parts, etc. (Continued on page 1138)

Personal Equipment

Uniforms, goggles, Johnson Improved, Landing Tents, tents, Johnson's First Aid Kit, etc. (Continued on page 1138)

Manufacturing and Maintenance Supplies

Johnson's Duster, surface hole and nut, etc. (Continued on page 1138)

Service

A large stock of service parts and accessories for the industry and manufacturing facilities. (Continued on page 1138)

for New and better Aircraft Engine Pilot Log Books

They have been designed by a pilot and are really the most popular form yet devised.

These books make no credit as a permanent record. They are designed to be used as a record of the pilot's work and to be kept in the log book of the aircraft. They are designed to be used as a record of the pilot's work and to be kept in the log book of the aircraft.

Can, cover, records by pilot and engine log. Price \$1.00. (Continued on page 1138)

These books make no credit as a permanent record. They are designed to be used as a record of the pilot's work and to be kept in the log book of the aircraft.

Record Cards and Other Forms

Standard the Engine Log Book with indexes, checklist and log book. Price \$1.00. (Continued on page 1138)

Have You This Catalog?

Every aviator, pilot, mechanic or airplane owner should have the latest Johnson's Catalog. It is the most complete and up-to-date catalog of the industry.



Johnson Airplane & Supply Co.

Dayton, Ohio

THANK YOU for ordering AVIATION

THANK YOU for ordering AVIATION

First 7 places in National Air Tour

Taken by Macwhyte-Equipped
Planes

Also, 19 out of the 22 planes that finished were equipped with Macwhyte Tie Rods. If you are not already using Macwhyte Tie Rods, write today for full details—Streamline for external and Round for internal bracing. Macwhyte Company, 2945 Fourteenth Avenue, Kenosha, Wisconsin.

MACWHYTE
Streamline and Round
TIE RODS

beacon and lights, and to carry on whatever duties may be assigned to them.

Telephone-typewriter service has been initiated by the Department of Commerce at Haddley Field, at Cleveland, at Chicago and at San Francisco, where in each place the local radio station, weather bureau offices and the airport offices are all interconnected. It is planned, at a later date, to equip experimentally some airways with complete telephone-typewriter service between airports.

When an aviator leaves an airport he should be given information of the weather along the route ahead of him and a forecast of the nature of probable changes during the time of his flight. If general weather conditions are



A typist operating a telephone typewriter of the sort which prints a message on a wide roll of paper. The machine is sometimes known as a "page printer." (New York Telephone Co. photo)

settled or if his flight is a short one, a forecast is entirely adequate. However, for long flights and at times of uncertain and threatening weather, it is important that the pilot be continuously advised by radio of the weather conditions he may encounter during his flight. In particular, reports of the visibility and landing conditions at the airport where he expects to land and where warnings should be sent him. Weather and landing advice can be broadcast from each airport along the airway. Portents of radio transmitters at airports and receiving sets in the planes will make possible a simple one-way system of communication and will permit any number of planes in the air to be advised without confusion.

The Department of Commerce, in its program of Aids for Air Navigation plans to install radio-telephone transmitters at principal terminal fields to broadcast, to planes in flight, weather and landing information. In addition, there will be a radio-beacon service to assist pilots in finding the landing field.

European practice, however, has not developed a broadcasting service along this line but has evolved a two-way system in which the pilot of the airplane talks with the nearest airport. Such a system has obvious advantages where it is desired by an air transport company to instruct or control rather than merely inform its aviators. The obvious disadvantage lies in the fact that on a single radio channel the airport can converse with only a single airplane at a time. On the London-Paris airway, it is reported, the practice has recently been adopted of com-



N-B Army Helmets

For Fall and Winter Flying
No. 6 \$6.00

Get ready now for the coming temperatures. This helmet is of dark khaki leather, lined with soft wool. It is a medium weight, ideal for both hot and winter.

Specify Air Mail Helmet No. 10

Imported Customers: cap with grey suede leather lining and wool inner lining.

N-B Navy Helmet No. 5

A dark chocolate leather helmet lined with chocolate and black heavy.

Specify Helmet No. 10

605 Empire Branch, Inc.
NICHOLAS-HEAZLEY AIRPLANE CO., Inc.
100 N. ENGLISH STREET MARSHALL, MO



"IT'S A GUARANTEED HANGAR"

Guaranteed Buildings have been built for nearly 50 years and are the best of our construction. They are strong and give the maximum life. We have 100,000 sq. ft. of hangar built for \$10,000.00.

GUARANTEED AIRCRAFT HANGAR CO.

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7

10001 10th Avenue, Chicago 4, Ill. Telephone ME 3, N. 7



Airports and Aviation Buildings by Austin

AUSTIN specializes in the design and construction of hangars, factory buildings, airports and other aviation projects. Efficient layout, good appearance, reasonable cost, and speed in construction characterize Austin aviation buildings from Coast to Coast.

Whether you are interested in the complete service—design, construction and equipment—or in spot and other materials for erection by a local builder, it will pay you to get in touch with Austin.

Ask for approximate cost and new booklet

"Design and Construction Buildings"

THE AUSTIN COMPANY

Architects, Engineers and Builders

for the Aviation Industry

CLEVELAND, OHIO

San Francisco
New York
Chicago
Los Angeles
Portland

St. Louis
Portland
Seattle
San Francisco



Swift... in action Swift... in name

A new 2-Place Sport Bi-Plane —120 H.P.—new in design from prop to tail-skid—embodying entirely new principles in engineering and design giving it tremendous speed and great stability, at remarkably low operating cost, will soon be seen in the skies.

Watch for the full announcement in an early issue of this publication

**Swift Aircraft
CORPORATION**
Wichita, Kansas

THANK YOU for watching AVIATION

HAMILTON PROPELLERS
ARE USED THE WORLD OVER
HAMILTON
PROPELLERS
Hawthorne Ave. Bldg. Co., 40 Kaula Ave., Milwaukee, Wis.

Back Numbers of AVIATION

A great many copies of AVIATION, from August 1, 1916 to date are now available from our files. Price for 1 to 20 copies, 20 cents each; more than 20, 15 cents each.

Back Department

AVIATION PUBLISHING CORPORATION
250 West 57th Street, New York

THANK YOU for watching AVIATION



STRENGTH

The actual structural strength of these wheels is far in excess of the requirements of the official hand books or of the ability of the tires used to stand, thus increasing the FACTOR OF SAFETY at a vital point. This with decreased weight.

Reader: Wheel and Brakes are made in production on standard sizes.

Write for literature, prices and applications: U. S. and abroad.

BENDIX BRAKE COMPANY
General Offices and Plant: South Bend, Ind.
Detroit: Bendix Corporation, Chicago

BENDIX 4 BRAKES

FOR SAFETY

IDECO STEEL HANGARS

The building an IDECO in a private landing field IDECO is ready to furnish hangars, shops, offices, storage rooms and other buildings, landing lights, beacon, floodlight and radio towers and any of the various structural material necessary in a modern airport or landing strip. Both in the matter of planning and building such equipment, IDECO engineers are at your service.

INTERNATIONAL DERRICK & EQUIPMENT COMPANY
Columbus, Ohio Toronto, Ont.

receiving on one channel by radio telegraph with the large planes which carry a radio operator and on another channel by radio telephone with the smaller planes.

Two-way communication has the great and obvious merit of permitting a pilot to discuss the weather conditions with an airport meteorologist, to consider alternative landing places in view of such factors as his remaining fuel supply or the direction of wind, and to decide if necessary on a change in landing place and to be assured of arrangements there for the care of his passengers and mail. It seems reasonable, therefore, to predict that operators of air transport firms will require two-way communication with their planes in flight, although taxi services and private owners without ground organization along the airway may, in general, be content with a public one-way broadcasting service.

Whether one-way or two-way communication is desired for plane-to-ground use, it appears that radio telegraph as distinguished from telephony will be essential. Radio telephony requires on board the plane the individual attention of a special radio operator for sending and receiving. Although very large multi-engine passenger planes will certainly carry a relief pilot in flight, it is doubtful whether good commercial pilots can be made into good telegraphers and vice versa. For long-distance over-sea flights and for expeditionary purposes the radio telegraph has, without doubt, preponderant advantages of longer range with the same transmitter power and of intelligibility through a higher level of interfering signals and acoustic noise on board, made less an annoyance in communication through with surface vessels. For regular service on established airways, however, the telephone is undoubtedly superior.

Will Increase Demand for Navigational Aids

The perfection of facilities for communicating weather and landing information to planes in flight, which will enable them to operate with safety under relatively unfavorable meteorological conditions, will greatly stimulate the demand for improved aids to navigation. It seems to be established that flying under conditions of poor visibility, when landmarks are totally obscured and beacon lights are useless, requires some form of radio guidance if the pilot is to find his way through.

A number of systems have been proposed for this purpose. The London-Harlem Airway is equipped with radio direction-finding equipment on the ground by means of which the position of planes can be determined on request. The disadvantages of this arrangement lie mainly in its relative slowness and its lack of traffic capacity. The radio beacons of the type being developed by the Bureau of Standards, giving an equidistant cone which can be observed by the plane, is free from these objections. It is, however, subject to the disadvantage that it indicates a straight-line course which cannot always coincide with the airway and is of little value if altitudes are required to avoid sharp turns and hazy areas.

Another system, a recent development of the British Royal Air Force, employs a rotating loop transmitter at the ground station and indicates the bearing of the plane with respect to the transmitter by means of a special spot search light. This system is relatively slow but permits the pilot to navigate as he would if one or more beacon lights were visible. All of these various methods of guidance have special advantages and disadvantages, and occupy more or less of the valuable and restricted air space. The evolution of the system which is most satisfactory will be a matter of time and will require close co-operation on the part of all factors in the industry.

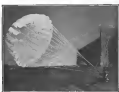
(Continued on page 1144)

"For Safety in the Air, — Everywhere"

No detail of the

IRVING AIR CHUTE

has been left ready to drop—regardless of every condition of emergency. Used by all Air Forces of the United States, Great Britain and 21 other Governments.



OVER 300 LIVES SAVED IN EMERGENCY
OFFER 100% SUCCESSFUL "LIFT" DROPS
OVER 100% SUCCESSFUL TEST DROPS

Illustrated literature on request

IRVING AIR CHUTE COMPANY, Inc.
372 Pearl Street Buffalo, N. Y.

Cable Address: "Irvin Buffalo, N. Y., U. S. A."

RYAN SIEMENS

... can save radio location
between 5 and 7 miles
for engines developing 50
and 100 h. p. respectively
These engines are approved
for all Air Mail Carriers
Lines.

T. C. RYAN
AERONAUTICAL CORP.
Cleveland, Ohio New York



ROEBLING
AIRCRAFT PRODUCTS
Wire—Cord—Strand
Thimbles and Ferrules
Electrical Control Cables
Welding Wire

JOHN A. ROEBLING'S SONS CO., TRUSTEES, N. J.

S.S. White
Flexible Shafts
for
Tachometer Driving
and other
Power Transmission
{ Made by the largest producer
of steel wire flexible shafts }

The S.S. White Dental Mfg. Co.
Industrial Division
151 West 42nd St. New York, N.Y.

Write for free book,
Send for request

Where Conditions are Most Exacting

Use
Ferdin
Special
Aviation
Cite

L.W. Ferdinand & Co.
315 Randolph Street, Kansas City, Mo.
Write for Bulletin

BERRY BROTHERS'
Progressive Aircraft Finishes

Immunize airplanes — no complete work
needed by CENTRAL WALL PAPER &
PAINT CO. INDIANAPOLIS INDIANA
DOWNER AIRPLANE & SERVICE CO.
PARK DAYTON OHIO RICHMOND
SHAW AIRPLANE CO. INC. NEW
BRIDGE, NEW JERSEY

BERRY BROTHERS, Inc.
Vandalia, Ohio Kansas City, Mo. Los Angeles, Cal.
Detroit, Mich. 300-1700 Broadway—1114

Shepard Sectional Steel Airplane Hangars



Can be quickly erected with unskilled labor. Steel rails and galvanized sheets riveted to support sections in slant holes slanted thus greatly reducing time of erection. To erect both sectional airplane hanger rails and built up trusses, rafters and beams, apply bolt sheets and place the rails and building is ready for business.

ARTHUR B. SHEPARD CORP.
11 Broadway, New York
Sole Agents, Newark, N. J.

Bean's Flying Helmet



A military helmet of approved design at a less price than the ordinary sheepskin helmet. Made throughout from lightest grade cellulose. Snap strap under chin and two snap straps on back for goggles. Specially adapted for aviators, motorcycle and automobile racers.

Lightest helmet \$5.35

Price: Safety Head, \$18.50. Chamois or lambskin Head, \$5.35. Postpaid. Send for catalog and free samples.

L. L. BEAN, 30 MAIN STREET, FREEPORT, MAINE

Bell Telephone Laboratories, at its radio station at Whippany, New Jersey, has erected an experimental two-way radio-telephone system and radio beacon. In connection with this apparatus a 100-watt Fairbanks-Coleman engine with a Pratt and Whitney "Wasp" engine. The phone has been carefully loaded and checked and is equipped with radio field-measuring apparatus of the Laboratories' design. With this phone exact measurements can be made at various altitudes under different weather conditions of the efficiency of radio transmissions from the Whippany transmitter. In addition the phone carries radio



A sending-receiving "printer." Messages are sent by operating the keyboard, and are received on a paper tape, which may be printed as a message blank of desired

transmission and receiving use of experimental design. It is, in fact a flying radio laboratory in which the engineers may experiment under actual flying conditions.

Whether a radio beacon service and a radio telephone service at all the various airports over the country can be made practicable is largely a question of available ether channels. By international agreement, the frequency band 265-315 kcs. (1050-590 meters) is reserved for radio beacons, both marine and air service. For "air mobile service exclusively" there is reserved the band 315-350 kcs. (590-850 meters) in which the 900 meter wave (333 kcs.) is reserved as an air service calling wave and is not to be assigned.

Radio telephony requires a band of frequencies sufficiently wide to include the "side bands" of speech frequency. For distinct transmission of speech, neglecting certain requirements of musical quality, this might require a minimum of 5000 cycles. In the band reserved for "air mobile service exclusively" there is room, therefore, for but three telephone channels above and three below the calling wave, or a total of six channels. Assuming that a beacon requires a channel width of but 300 cycles, there are altogether five channels and six hundred beacons channels in the band 265-315 kcs.

The band reserved for beacons is already partly occupied by marine beacons, and near the coast difficulty may arise in finding clear channels for airport beacons. Although it is probable that, by a proper geographical distribution of frequencies, there may be worked out without undue interference an adequate beacon service, we can make no

AVIATION
October 8, 1928

AVIATION
October 8, 1928

Protect your aviation investment—

ADEQUATE insurance of reasonable rates is one of the vital factors in profitable commercial flying.

WE have built up an aviation insurance business through knowledge based upon flying experience and service to manufacturers, operators and pilots.

Our Policies are Written to Cover Your Individual Needs

The and Transportation, Public Utilities, Property Damage, Personal Liability, Automobile Liability, Marine, Loss by Theft, Passenger Liability, Workers' Damage and Workmen's Compensation.

Let us show you policies Our Insurance Service is Free

JAMES E. MALLETTE & SON
TORRINGTON, CONNECTICUT



Type F, Air
Futuristic
Compass

The modern Aircraft Compass

(Both mounting)

Type F, Air Futuristic Compass is built on modern design. Mounts both with instrument board, or on a separate panel, and is made by means of synthetic resin, giving long life and great accuracy.

CONSOLIDATED Instrument Company

41 East 42nd Street, New York
Manufacturers of all types of aircraft compasses, gyrocompasses, inclinometers, etc. and also electronic compasses, magnetic field strength, etc. and light etc.



PERRY-AUSTEN DOPES

Perry-Austen Clear Acetate Dope

The Leading Lacquer

The Best Finish (Undercoat)—Our Patent

Undercoat—Our Patent

PERRY-AUSTEN MFG. CO.

Contractors in United States Government

Main Office and Works—Greenwich, Staten Island, N. Y.

Tel: Douglas 316 70

Chicago: 308 N. Dearborn St. Tel: Superior 6468

You Need This Book to Know Aircraft Engines

Condensed Contents

Aircraft Engines, 1-100
Aircraft Engines, 101-200
Aircraft Engines, 201-300
Aircraft Engines, 301-400
Aircraft Engines, 401-500
Aircraft Engines, 501-600
Aircraft Engines, 601-700
Aircraft Engines, 701-800
Aircraft Engines, 801-900
Aircraft Engines, 901-1000
Aircraft Engines, 1001-1100
Aircraft Engines, 1101-1200
Aircraft Engines, 1201-1300
Aircraft Engines, 1301-1400
Aircraft Engines, 1401-1500
Aircraft Engines, 1501-1600
Aircraft Engines, 1601-1700
Aircraft Engines, 1701-1800
Aircraft Engines, 1801-1900
Aircraft Engines, 1901-2000
Aircraft Engines, 2001-2100
Aircraft Engines, 2101-2200
Aircraft Engines, 2201-2300
Aircraft Engines, 2301-2400
Aircraft Engines, 2401-2500
Aircraft Engines, 2501-2600
Aircraft Engines, 2601-2700
Aircraft Engines, 2701-2800
Aircraft Engines, 2801-2900
Aircraft Engines, 2901-3000
Aircraft Engines, 3001-3100
Aircraft Engines, 3101-3200
Aircraft Engines, 3201-3300
Aircraft Engines, 3301-3400
Aircraft Engines, 3401-3500
Aircraft Engines, 3501-3600
Aircraft Engines, 3601-3700
Aircraft Engines, 3701-3800
Aircraft Engines, 3801-3900
Aircraft Engines, 3901-4000
Aircraft Engines, 4001-4100
Aircraft Engines, 4101-4200
Aircraft Engines, 4201-4300
Aircraft Engines, 4301-4400
Aircraft Engines, 4401-4500
Aircraft Engines, 4501-4600
Aircraft Engines, 4601-4700
Aircraft Engines, 4701-4800
Aircraft Engines, 4801-4900
Aircraft Engines, 4901-5000
Aircraft Engines, 5001-5100
Aircraft Engines, 5101-5200
Aircraft Engines, 5201-5300
Aircraft Engines, 5301-5400
Aircraft Engines, 5401-5500
Aircraft Engines, 5501-5600
Aircraft Engines, 5601-5700
Aircraft Engines, 5701-5800
Aircraft Engines, 5801-5900
Aircraft Engines, 5901-6000
Aircraft Engines, 6001-6100
Aircraft Engines, 6101-6200
Aircraft Engines, 6201-6300
Aircraft Engines, 6301-6400
Aircraft Engines, 6401-6500
Aircraft Engines, 6501-6600
Aircraft Engines, 6601-6700
Aircraft Engines, 6701-6800
Aircraft Engines, 6801-6900
Aircraft Engines, 6901-7000
Aircraft Engines, 7001-7100
Aircraft Engines, 7101-7200
Aircraft Engines, 7201-7300
Aircraft Engines, 7301-7400
Aircraft Engines, 7401-7500
Aircraft Engines, 7501-7600
Aircraft Engines, 7601-7700
Aircraft Engines, 7701-7800
Aircraft Engines, 7801-7900
Aircraft Engines, 7901-8000
Aircraft Engines, 8001-8100
Aircraft Engines, 8101-8200
Aircraft Engines, 8201-8300
Aircraft Engines, 8301-8400
Aircraft Engines, 8401-8500
Aircraft Engines, 8501-8600
Aircraft Engines, 8601-8700
Aircraft Engines, 8701-8800
Aircraft Engines, 8801-8900
Aircraft Engines, 8901-9000
Aircraft Engines, 9001-9100
Aircraft Engines, 9101-9200
Aircraft Engines, 9201-9300
Aircraft Engines, 9301-9400
Aircraft Engines, 9401-9500
Aircraft Engines, 9501-9600
Aircraft Engines, 9601-9700
Aircraft Engines, 9701-9800
Aircraft Engines, 9801-9900
Aircraft Engines, 9901-10000
Aircraft Engines, 10001-10100
Aircraft Engines, 10101-10200
Aircraft Engines, 10201-10300
Aircraft Engines, 10301-10400
Aircraft Engines, 10401-10500
Aircraft Engines, 10501-10600
Aircraft Engines, 10601-10700
Aircraft Engines, 10701-10800
Aircraft Engines, 10801-10900
Aircraft Engines, 10901-11000
Aircraft Engines, 11001-11100
Aircraft Engines, 11101-11200
Aircraft Engines, 11201-11300
Aircraft Engines, 11301-11400
Aircraft Engines, 11401-11500
Aircraft Engines, 11501-11600
Aircraft Engines, 11601-11700
Aircraft Engines, 11701-11800
Aircraft Engines, 11801-11900
Aircraft Engines, 11901-12000
Aircraft Engines, 12001-12100
Aircraft Engines, 12101-12200
Aircraft Engines, 12201-12300
Aircraft Engines, 12301-12400
Aircraft Engines, 12401-12500
Aircraft Engines, 12501-12600
Aircraft Engines, 12601-12700
Aircraft Engines, 12701-12800
Aircraft Engines, 12801-12900
Aircraft Engines, 12901-13000
Aircraft Engines, 13001-13100
Aircraft Engines, 13101-13200
Aircraft Engines, 13201-13300
Aircraft Engines, 13301-13400
Aircraft Engines, 13401-13500
Aircraft Engines, 13501-13600
Aircraft Engines, 13601-13700
Aircraft Engines, 13701-13800
Aircraft Engines, 13801-13900
Aircraft Engines, 13901-14000
Aircraft Engines, 14001-14100
Aircraft Engines, 14101-14200
Aircraft Engines, 14201-14300
Aircraft Engines, 14301-14400
Aircraft Engines, 14401-14500
Aircraft Engines, 14501-14600
Aircraft Engines, 14601-14700
Aircraft Engines, 14701-14800
Aircraft Engines, 14801-14900
Aircraft Engines, 14901-15000
Aircraft Engines, 15001-15100
Aircraft Engines, 15101-15200
Aircraft Engines, 15201-15300
Aircraft Engines, 15301-15400
Aircraft Engines, 15401-15500
Aircraft Engines, 15501-15600
Aircraft Engines, 15601-15700
Aircraft Engines, 15701-15800
Aircraft Engines, 15801-15900
Aircraft Engines, 15901-16000
Aircraft Engines, 16001-16100
Aircraft Engines, 16101-16200
Aircraft Engines, 16201-16300
Aircraft Engines, 16301-16400
Aircraft Engines, 16401-16500
Aircraft Engines, 16501-16600
Aircraft Engines, 16601-16700
Aircraft Engines, 16701-16800
Aircraft Engines, 16801-16900
Aircraft Engines, 16901-17000
Aircraft Engines, 17001-17100
Aircraft Engines, 17101-17200
Aircraft Engines, 17201-17300
Aircraft Engines, 17301-17400
Aircraft Engines, 17401-17500
Aircraft Engines, 17501-17600
Aircraft Engines, 17601-17700
Aircraft Engines, 17701-17800
Aircraft Engines, 17801-17900
Aircraft Engines, 17901-18000
Aircraft Engines, 18001-18100
Aircraft Engines, 18101-18200
Aircraft Engines, 18201-18300
Aircraft Engines, 18301-18400
Aircraft Engines, 18401-18500
Aircraft Engines, 18501-18600
Aircraft Engines, 18601-18700
Aircraft Engines, 18701-18800
Aircraft Engines, 18801-18900
Aircraft Engines, 18901-19000
Aircraft Engines, 19001-19100
Aircraft Engines, 19101-19200
Aircraft Engines, 19201-19300
Aircraft Engines, 19301-19400
Aircraft Engines, 19401-19500
Aircraft Engines, 19501-19600
Aircraft Engines, 19601-19700
Aircraft Engines, 19701-19800
Aircraft Engines, 19801-19900
Aircraft Engines, 19901-20000
Aircraft Engines, 20001-20100
Aircraft Engines, 20101-20200
Aircraft Engines, 20201-20300
Aircraft Engines, 20301-20400
Aircraft Engines, 20401-20500
Aircraft Engines, 20501-20600
Aircraft Engines, 20601-20700
Aircraft Engines, 20701-20800
Aircraft Engines, 20801-20900
Aircraft Engines, 20901-21000
Aircraft Engines, 21001-21100
Aircraft Engines, 21101-21200
Aircraft Engines, 21201-21300
Aircraft Engines, 21301-21400
Aircraft Engines, 21401-21500
Aircraft Engines, 21501-21600
Aircraft Engines, 21601-21700
Aircraft Engines, 21701-21800
Aircraft Engines, 21801-21900
Aircraft Engines, 21901-22000
Aircraft Engines, 22001-22100
Aircraft Engines, 22101-22200
Aircraft Engines, 22201-22300
Aircraft Engines, 22301-22400
Aircraft Engines, 22401-22500
Aircraft Engines, 22501-22600
Aircraft Engines, 22601-22700
Aircraft Engines, 22701-22800
Aircraft Engines, 22801-22900
Aircraft Engines, 22901-23000
Aircraft Engines, 23001-23100
Aircraft Engines, 23101-23200
Aircraft Engines, 23201-23300
Aircraft Engines, 23301-23400
Aircraft Engines, 23401-23500
Aircraft Engines, 23501-23600
Aircraft Engines, 23601-23700
Aircraft Engines, 23701-23800
Aircraft Engines, 23801-23900
Aircraft Engines, 23901-24000
Aircraft Engines, 24001-24100
Aircraft Engines, 24101-24200
Aircraft Engines, 24201-24300
Aircraft Engines, 24301-24400
Aircraft Engines, 24401-24500
Aircraft Engines, 24501-24600
Aircraft Engines, 24601-24700
Aircraft Engines, 24701-24800
Aircraft Engines, 24801-24900
Aircraft Engines, 24901-25000
Aircraft Engines, 25001-25100
Aircraft Engines, 25101-25200
Aircraft Engines, 25201-25300
Aircraft Engines, 25301-25400
Aircraft Engines, 25401-25500
Aircraft Engines, 25501-25600
Aircraft Engines, 25601-25700
Aircraft Engines, 25701-25800
Aircraft Engines, 25801-25900
Aircraft Engines, 25901-26000
Aircraft Engines, 26001-26100
Aircraft Engines, 26101-26200
Aircraft Engines, 26201-26300
Aircraft Engines, 26301-26400
Aircraft Engines, 26401-26500
Aircraft Engines, 26501-26600
Aircraft Engines, 26601-26700
Aircraft Engines, 26701-26800
Aircraft Engines, 26801-26900
Aircraft Engines, 26901-27000
Aircraft Engines, 27001-27100
Aircraft Engines, 27101-27200
Aircraft Engines, 27201-27300
Aircraft Engines, 27301-27400
Aircraft Engines, 27401-27500
Aircraft Engines, 27501-27600
Aircraft Engines, 27601-27700
Aircraft Engines, 27701-27800
Aircraft Engines, 27801-27900
Aircraft Engines, 27901-28000
Aircraft Engines, 28001-28100
Aircraft Engines, 28101-28200
Aircraft Engines, 28201-28300
Aircraft Engines, 28301-28400
Aircraft Engines, 28401-28500
Aircraft Engines, 28501-28600
Aircraft Engines, 28601-28700
Aircraft Engines, 28701-28800
Aircraft Engines, 28801-28900
Aircraft Engines, 28901-29000
Aircraft Engines, 29001-29100
Aircraft Engines, 29101-29200
Aircraft Engines, 29201-29300
Aircraft Engines, 29301-29400
Aircraft Engines, 29401-29500
Aircraft Engines, 29501-29600
Aircraft Engines, 29601-29700
Aircraft Engines, 29701-29800
Aircraft Engines, 29801-29900
Aircraft Engines, 29901-30000
Aircraft Engines, 30001-30100
Aircraft Engines, 30101-30200
Aircraft Engines, 30201-30300
Aircraft Engines, 30301-30400
Aircraft Engines, 30401-30500
Aircraft Engines, 30501-30600
Aircraft Engines, 30601-30700
Aircraft Engines, 30701-30800
Aircraft Engines, 30801-30900
Aircraft Engines, 30901-31000
Aircraft Engines, 31001-31100
Aircraft Engines, 31101-31200
Aircraft Engines, 31201-31300
Aircraft Engines, 31301-31400
Aircraft Engines, 31401-31500
Aircraft Engines, 31501-31600
Aircraft Engines, 31601-31700
Aircraft Engines, 31701-31800
Aircraft Engines, 31801-31900
Aircraft Engines, 31901-32000
Aircraft Engines, 32001-32100
Aircraft Engines, 32101-32200
Aircraft Engines, 32201-32300
Aircraft Engines, 32301-32400
Aircraft Engines, 32401-32500
Aircraft Engines, 32501-32600
Aircraft Engines, 32601-32700
Aircraft Engines, 32701-32800
Aircraft Engines, 32801-32900
Aircraft Engines, 32901-33000
Aircraft Engines, 33001-33100
Aircraft Engines, 33101-33200
Aircraft Engines, 33201-33300
Aircraft Engines, 33301-33400
Aircraft Engines, 33401-33500
Aircraft Engines, 33501-33600
Aircraft Engines, 33601-33700
Aircraft Engines, 33701-33800
Aircraft Engines, 33801-33900
Aircraft Engines, 33901-34000
Aircraft Engines, 34001-34100
Aircraft Engines, 34101-34200
Aircraft Engines, 34201-34300
Aircraft Engines, 34301-34400
Aircraft Engines, 34401-34500
Aircraft Engines, 34501-34600
Aircraft Engines, 34601-34700
Aircraft Engines, 34701-34800
Aircraft Engines, 34801-34900
Aircraft Engines, 34901-35000
Aircraft Engines, 35001-35100
Aircraft Engines, 35101-35200
Aircraft Engines, 35201-35300
Aircraft Engines, 35301-35400
Aircraft Engines, 35401-35500
Aircraft Engines, 35501-35600
Aircraft Engines, 35601-35700
Aircraft Engines, 35701-35800
Aircraft Engines, 35801-35900
Aircraft Engines, 35901-36000
Aircraft Engines, 36001-36100
Aircraft Engines, 36101-36200
Aircraft Engines, 36201-36300
Aircraft Engines, 36301-36400
Aircraft Engines, 36401-36500
Aircraft Engines, 36501-36600
Aircraft Engines, 36601-36700
Aircraft Engines, 36701-36800
Aircraft Engines, 36801-36900
Aircraft Engines, 36901-37000
Aircraft Engines, 37001-37100
Aircraft Engines, 37101-37200
Aircraft Engines, 37201-37300
Aircraft Engines, 37301-37400
Aircraft Engines, 37401-37500
Aircraft Engines, 37501-37600
Aircraft Engines, 37601-37700
Aircraft Engines, 37701-37800
Aircraft Engines, 37801-37900
Aircraft Engines, 37901-38000
Aircraft Engines, 38001-38100
Aircraft Engines, 38101-38200
Aircraft Engines, 38201-38300
Aircraft Engines, 38301-38400
Aircraft Engines, 38401-38500
Aircraft Engines, 38501-38600
Aircraft Engines, 38601-38700
Aircraft Engines, 38701-38800
Aircraft Engines, 38801-38900
Aircraft Engines, 38901-39000
Aircraft Engines, 39001-39100
Aircraft Engines, 39101-39200
Aircraft Engines, 39201-39300
Aircraft Engines, 39301-39400
Aircraft Engines, 39401-39500
Aircraft Engines, 39501-39600
Aircraft Engines, 39601-39700
Aircraft Engines, 39701-39800
Aircraft Engines, 39801-39900
Aircraft Engines, 39901-40000
Aircraft Engines, 40001-40100
Aircraft Engines, 40101-40200
Aircraft Engines, 40201-40300
Aircraft Engines, 40301-40400
Aircraft Engines, 40401-40500
Aircraft Engines, 40501-40600
Aircraft Engines, 40601-40700
Aircraft Engines, 40701-40800
Aircraft Engines, 40801-40900
Aircraft Engines, 40901-41000
Aircraft Engines, 41001-41100
Aircraft Engines, 41101-41200
Aircraft Engines, 41201-41300
Aircraft Engines, 41301-41400
Aircraft Engines, 41401-41500
Aircraft Engines, 41501-41600
Aircraft Engines, 41601-41700
Aircraft Engines, 41701-41800
Aircraft Engines, 41801-41900
Aircraft Engines, 41901-42000
Aircraft Engines, 42001-42100
Aircraft Engines, 42101-42200
Aircraft Engines, 42201-42300
Aircraft Engines, 42301-42400
Aircraft Engines, 42401-42500
Aircraft Engines, 42501-42600
Aircraft Engines, 42601-42700
Aircraft Engines, 42701-42800
Aircraft Engines, 42801-42900
Aircraft Engines, 42901-43000
Aircraft Engines, 43001-43100
Aircraft Engines, 43101-43200
Aircraft Engines, 43201-43300
Aircraft Engines, 43301-43400
Aircraft Engines, 43401-43500
Aircraft Engines, 43501-43600
Aircraft Engines, 43601-43700
Aircraft Engines, 43701-43800
Aircraft Engines, 43801-43900
Aircraft Engines, 43901-44000
Aircraft Engines, 44001-44100
Aircraft Engines, 44101-44200
Aircraft Engines, 44201-44300
Aircraft Engines, 44301-44400
Aircraft Engines, 44401-44500
Aircraft Engines, 44501-44600
Aircraft Engines, 44601-44700
Aircraft Engines, 44701-44800
Aircraft Engines, 44801-44900
Aircraft Engines, 44901-45000
Aircraft Engines, 45001-45100
Aircraft Engines, 45101-45200
Aircraft Engines, 45201-45300
Aircraft Engines, 45301-45400
Aircraft Engines, 45401-45500
Aircraft Engines, 45501-45600
Aircraft Engines, 45601-45700
Aircraft Engines, 45701-45800
Aircraft Engines, 45801-45900
Aircraft Engines, 45901-46000
Aircraft Engines, 46001-46100
Aircraft Engines, 46101-46200
Aircraft Engines, 46201-46300
Aircraft Engines, 46301-46400
Aircraft Engines, 46401-46500
Aircraft Engines, 46501-46600
Aircraft Engines, 46601-46700
Aircraft Engines, 46701-46800
Aircraft Engines, 46801-46900
Aircraft Engines, 46901-47000
Aircraft Engines, 47001-47100
Aircraft Engines, 47101-47200
Aircraft Engines, 47201-47300
Aircraft Engines, 47301-47400
Aircraft Engines, 47401-47500
Aircraft Engines, 47501-47600
Aircraft Engines, 47601-47700
Aircraft Engines, 47701-47800
Aircraft Engines, 47801-47900
Aircraft Engines, 47901-48000
Aircraft Engines, 48001-48100
Aircraft Engines, 48101-48200
Aircraft Engines, 48201-48300
Aircraft Engines, 48301-48400
Aircraft Engines, 48401-48500
Aircraft Engines, 48501-48600
Aircraft Engines, 48601-48700
Aircraft Engines, 48701-48800
Aircraft Engines, 48801-48900
Aircraft Engines, 48901-49000
Aircraft Engines, 49001-49100
Aircraft Engines, 49101-49200
Aircraft Engines, 49201-49300
Aircraft Engines, 49301-49400
Aircraft Engines, 49401-49500
Aircraft Engines, 49501-49600
Aircraft Engines, 49601-49700
Aircraft Engines, 49701-49800
Aircraft Engines, 49801-49900
Aircraft Engines, 49901-50000
Aircraft Engines, 50001-50100
Aircraft Engines, 50101-50200
Aircraft Engines, 50201-50300
Aircraft Engines, 50301-50400
Aircraft Engines, 50401-50500
Aircraft Engines, 50501-50600
Aircraft Engines, 50601-50700
Aircraft Engines, 50701-50800
Aircraft Engines, 50801-50900
Aircraft Engines, 50901-51000
Aircraft Engines, 51001-51100
Aircraft Engines, 51101-51200
Aircraft Engines, 51201-51300
Aircraft Engines, 51301-51400
Aircraft Engines, 51401-51500
Aircraft Engines, 51501-51600
Aircraft Engines, 51601-51700
Aircraft Engines, 51701-51800
Aircraft Engines, 51801-51900
Aircraft Engines, 51901-52000
Aircraft Engines, 52001-52100
Aircraft Engines, 52101-52200
Aircraft Engines, 52201-52300
Aircraft Engines, 52301-52400
Aircraft Engines, 52401-52500
Aircraft Engines, 52501-52600
Aircraft Engines, 52601-52700
Aircraft Engines, 52701-52800
Aircraft Engines, 52801-52900
Aircraft Engines, 52901-53000
Aircraft Engines, 53001-53100
Aircraft Engines, 53101-53200
Aircraft Engines, 53201-53300
Aircraft Engines, 53301-534



The Keystone "Pirate" Bomber Also Uses Belden Airplane Wire

ON THE KEYSTONE "PIRATE" bombardment plane used by the U. S. Army Air Corps, Belden Wire and Cable is used throughout for systems, lighting and power systems. Belden Wire is also used for building systems throughout the wings and fuselage to form the various systems.

The structural backbone of Belden Airplane Wire is its 1933 manufacturing plant in significant proof of its great superiority. Write today for the Belden Aircraft Wire Catalog and you will obtain information about the Belden Aircraft Wire Service.

Belden Manufacturing Co. 1000 N. Western Ave.

Specify Belden

Write today for the Belden Aircraft Wire Catalog and you will obtain information about the Belden Aircraft Wire Service.



Keeping warm is imperative in successfully fulfilling any flying mission. SNAPPY SNUG equipment gives the desired protection and comfort. Be prepared!

Write for catalog or for nearest dealer

CANVAS - LEATHER
SPECIALTY COMPANY

Trenton, N. J.

AVIATION
October 4, 1933

assumption that any extra space can be found in the beacon band for radio telephony.

A radio telephone system with a sufficiently powerful transmitter and sufficiently sensitive receiver to give reliable communication for 100 mi. will give fair communication ranges for perhaps 200 mi., and its carrier wave will interfere with reception for a much greater distance. To avoid interference due to the loading of carrier frequencies, airports within a few hundred miles of one another may be assigned to different frequency channels, but serious difficulty is at once apparent from a map of the national airways. Within 800 mi. of Chicago, for example, there are over 20 terminal fields or airports. If each of them already approached to occupy the available air telephone channels to cover the eastern and central United States without serious interference. By restricting power as much as possible and by other means yet to be devised, it may be found possible to assign the same wave length to airports relatively nearer together. For the distribution of weather information only, however, the airways may well find insufficient the frequencies in the exclusive band, 315-350 kcs.

On certain main routes, air transport companies will eventually require two-way telephone dispatching systems of their own to control plane movements. These systems will consist of radio stations situated at the various airports along the route and interconnected by suitable wire lines. The frequency channels required for such service cannot be found in the 315-350 kcs. band which, as just indicated, is apparently inadequate for the public services of weather broadcasting from airports. Further channels in the short-wave region appear to be necessary.

To Develop Two-Way Radio Telephone System

In the short wave region Bell Telephone Laboratories have initiated an additional development project. In cooperation with the Boeing Air Transport Co., the Laboratories have undertaken to survey the Chicago-San Francisco airway and to develop a system of two-way telephony between planes in flight and terminal landing fields on this route. The Boeing Company planes and landing fields will be equipped with experimental radio apparatus and a joint full scale experiment will be conducted during the winter of 1938-39. From this work it is hoped to determine for all air transport company the requirements for a two-way radio telephone service.

This development of two-way radio telephony on short waves is entirely distinct from the government's program on Audio Air Navigation. That service contemplates one-way radio telephony and direction finding on long waves. The government service is to be available to all firms who equip themselves to receive it. The two-way system is for private communication and dispatching service of air transport companies which wish to control their planes in flight, and to remain in constant communication with their pilots and passengers.

Also, although not yet required, it can safely be predicted that at least a few airports will soon have a land radio station in control precedence in the take-off and landing of airplanes. This virtually automatic traffic control can be accomplished by low-power two-way radio telephony. Pilots wishing to land may announce themselves and receive clear instructions by the airport manager on the ground tower to land at a designated part of the field.

In all these present and future problems, it is the policy of the American Telephone and Telegraph Co. and the Bell System to assist by developing ways and means for making available to commercial aviation the best possible communication service.

AVIATION
October 4, 1933

Plane Talk

—TALK like this, situated in every Grand Air Club, on the air and connected by the wiring in the motor in this motor.

FLIGHT RECORD

From Wichita to **Bismarck, N.D.**
Left Wichita Mo. 5:15 a.m. 10/1/33
Arrived Bismarck N.D. 3:30 p.m. 10/1/33
Flying time 10:15 hours
Average speed = 73.3
Amount of gas used = 163.6 lbs.
Amount of oil used = 15.0 lbs.
Interacting and internal telephone service.

2000 Miles South of Wichita, Motor Turned
1400 mi. Left 10/1/33
Arrived **Wichita, Mo.**
Distance **1400 miles**

TRAVEL AIR
FOR AIRCRAFT TRAVEL

AIRCRAFT RADIO

DESIGN AND CONSTRUCTION OF ALL TYPES AIRCRAFT, RADIO APPARATUS, INCLUDING RADIO COMPASS AND BEACON RECEIVERS

WRITE

E. W. DANNALS
RADIO ENGINEER

191 Greenwich St. New York City

SITKA SPRUCE

All clear selected grain for Aircraft. Spars and rib stock ready for immediate shipment—full size—all lengths. Send your list for immediate quotation. Small engine shipments made same day order is received. Our complete planing mill can run special size quick.

YOHO & HOOKER LUMBER CO.
Aircraft Department
240 WINE BUILDING YOUNGSTOWN, OHIO

Before the creation of **RESISTAL** eye injuries were not uncommon... without RESISTAL there is still danger. Which explains why careful pilots insist upon RESISTAL.

Non-Shatterable
Optically Safe

Strauss & Buegeleisen

20 Front Street
24 Styles to Choose from
Send for Catalog

Brooklyn, N. Y.

Specialists in AIRCRAFT SECURITIES

General Corporate Financing

Our Securities Department has just completed a survey of the Aircraft Industry from an investment standpoint.

See only on request. Ask for Circular A.

E. H. HOLMES & Co.

60 Wall Street New York, N. Y.

TITANINE

Exported Trade Mark

A Complete Range of
AIRPLANE FINISHING MATERIALS

Deep-gloss paint, black, white, aluminum or gray;
Clear enamel and acrylics dopes;
Ti-Two colored one-material dopes;
Fingerprint eraser dopes;
Wood and metal lacquer (for inside and outside finish)

TITANINE, Inc.
Union, Union County, New Jersey
Contractors to the United States Government



SIDE SLIPS

By ROBERT R. OGDEN

Further reports from Side Slip's Special Correspondent at the National Air Races in Los Angeles.

Dear Mr. Editor:

Well, sir, I and the rest of the boys has put over another national air race successfully. A course those not in the know may realize that I didn't have much to do with the success, but this only shows how retiring I am. The fact that there was crowds of 100,000 or more each day shows that the world had got around somehow regards I being present.

In the first place before describing the Races let me state I have found the easiest job in the world and if I can get the connections for myself I am not coming back out which is being weather forecaster for California. They was not a drop of rain during the Show and the spectators' comfort in they won't be any real Deal. Well, Writing down sort of weather forecasts appeals to me on account of you being able to make up your own months in advance and then take a vacation. A course if I could get the job it would be my luck that a Democratic administration would get in Washington in which cases they would be blizzards and monsoons all year for California.

One outstanding feature of this years events was that Casey Jones didn't wig as much with his Curtiss Robin. He had a forced landing on the second lap so changed a sock put in his outer muffler, but my version is that the whippers on his old OX motor got caught in the prop. One day he appears on the race, as these people joke terms their flying skills, with a beautiful black eye and a claim he got it by Los Angeles hitting him with an apple. These stories coupled with the facts that he flew in the race with a coat and vest leads me to fear Casey is not his old self. The whole affair out here fairly amounted down to a battle between the Army and Navy for the supremacy of the air. These boys does everything except trade shoes while on top of a hoop. They maybe even did that.

The aeronautical exhibit was very fine and in mass features was the amount of oil in the oil company's books, and the faith these California people has in their weather was indicated by the facts the entire show was under a colored sheetcloth tent and no other roof.

Los Angeles has a fine traffic system, but still a lot of accidents in I couldn't account for this until I noticed by chance one day that all the girls in town wears no stockings and sometimes just little socks. Right after that my car which I hired from a fellow got three busted fenders on account of other fellows looking at these girls as not where they was going. I also beg to state that the girls out here is prettier than they is in any other city except Chateau St. Paul.

They is one chap out here what really deserves special mention on account he being such a good fellow as helping everybody at the show. "Tommy" Thomas, he being just elected Vice of the Professional Pilots Assoc.

In conclusion let me state that this is the fastest air show ever put on in I hope the public as my vast so of shows will not give out all the credit but allow some to Cliff Henderson and numerous others what helped out.

Yrs V'y Tyle

The Intrepid Aviator



Collyer and Mears Clip the Wings of Time . . . and Silvertowns aid!

ONCE more America scores . . . this time with a new plane-to-ship-to-plane around-the-world record.

Capt. Charles B. D. Collyer and John H. Mears clipped the old and comparatively long-standing record by five days.

In this, as in all other conspicuous feats in aviation, Goodrich Silvertowns cushioned the wheels of the plane.

Peace-time aces know how vital strong,

dependable tire equipment is to safe hop-offs and landings. And how staunch Silvertowns are.

For that reason you find at the bottom of practically every outstanding air exploit this phrase:

"Tire equipment: Goodrich Silvertowns."

Whether you ride for records . . . or for a half-hour thrill . . . equip with Silvertowns . . . and safety.

THE B. F. GOODRICH RUBBER CO., Established 1870, Akron, Ohio

Goodrich

Rubber for Airplanes

THANK YOU for making AVIATION

Ireland Flying Boats

The demand for flying boats for use by commercial sportsmen and sightseeing operators has caused us to devote our entire production facilities during the balance of this year to aircraft of this type.

Practically the same ship as the successful Ireland Amphibian but with certain improvements which puts the Ireland Flying Boat in a class all by itself. Of course powered with the dependable Wright Whirlwind. See file.

Write for complete details

IRELAND AIRCRAFT, Inc.
Curtiss Field, Garden City, N. Y.

MILESTONES OF PROGRESS

1928... The Banner Year

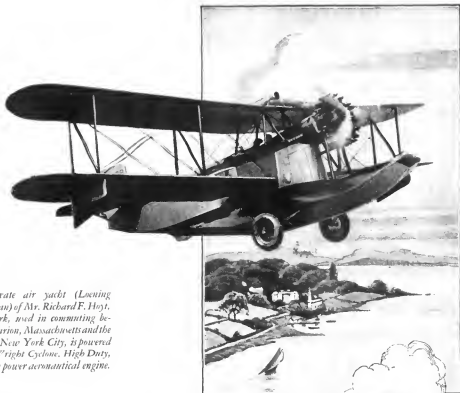
DURING 1928 more airplanes will be sold than ever before—but the dealer who sells the most, must have a place that has proven itself not only the most airyworthy, but the most popular in the public mind.

The answer is—THE SWALLOW—America's Finest Commercial airplane. Its performance record is unequalled.

Write or visit us today for full particulars about the Swallow Dealer's Franchise.

SWALLOW AIRPLANE CO.
WICHITA, KANSAS

THANK YOU for making AVIATION



The private air yacht (Loening Amphibian) of Mr. Richard F. Hoyt, New York, used in commuting between Marion, Massachusetts and the Battery, New York City, is powered with a Wright Cyclone, High Duty, 550 horse power aeronautical engine.

A WRIGHT CYCLONE ENGINE POWERS THIS AIR YACHT

The performance of the Loening Amphibian—built for sustained, steady service—finds its greatest adaptability with the Wright Cyclone High Duty Engine.

Built with the same care and for the same responsible performance as the now-famous "Whirlwind", the High Duty Cyclone gives a reliable, day in and day out service, secure on the foundation of proper design and unexcelled workmanship.

*That's why
More Pilots fly them!*

WRIGHT AERONAUTICAL CORPORATION
Paterson, N. J., U. S. A.



*High Duty
Wright Cyclone
550 H. P. Engine*

Air Associates Inc. — Cortez Field, Long Island, N. Y.

AUTHORIZED PARTS DEALERS

Pacific Aeromotive Corp. — Los Angeles, Cal.

Stout Air Services, Inc. — Dearborn, Mich.

WRIGHT